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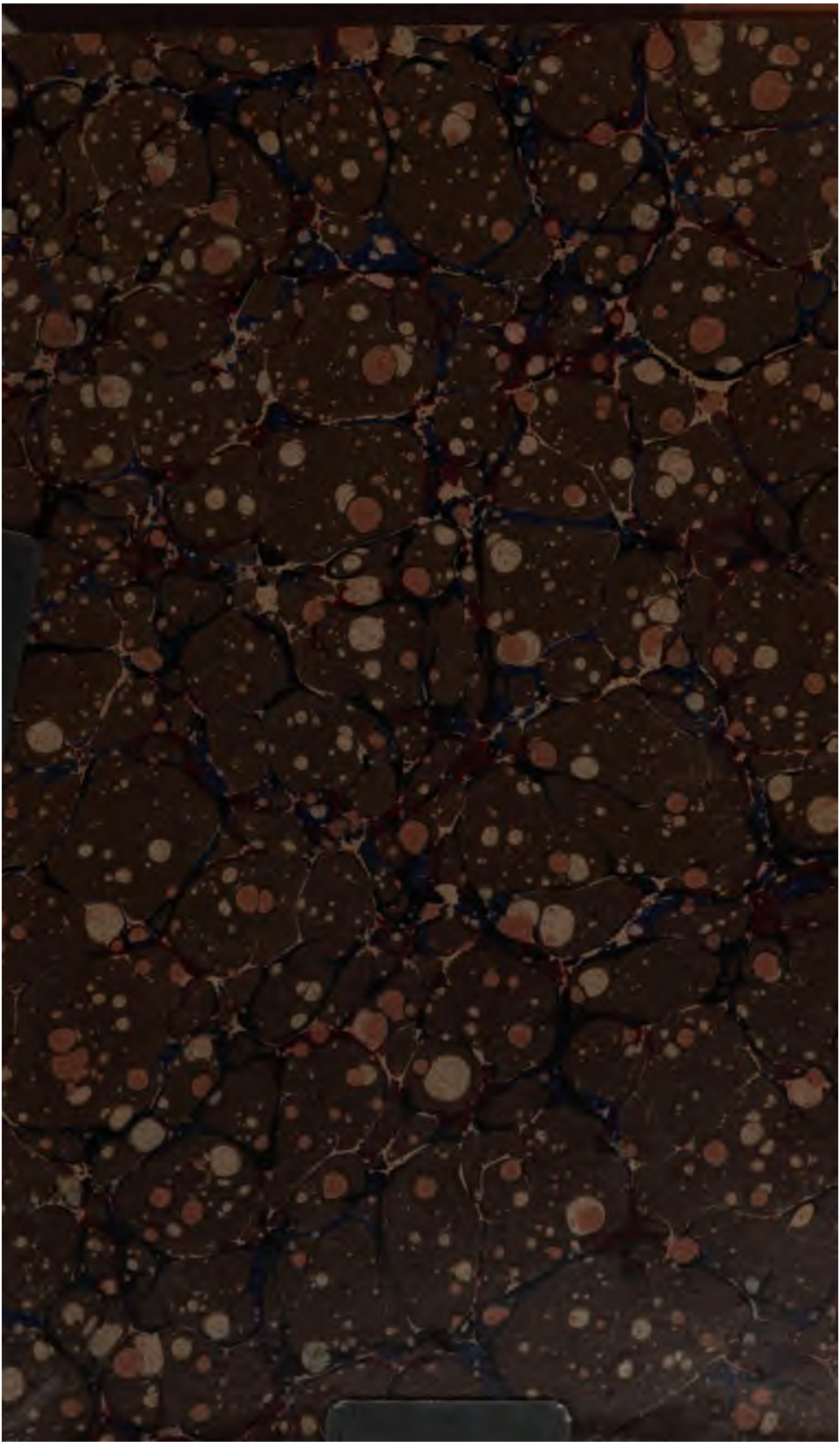

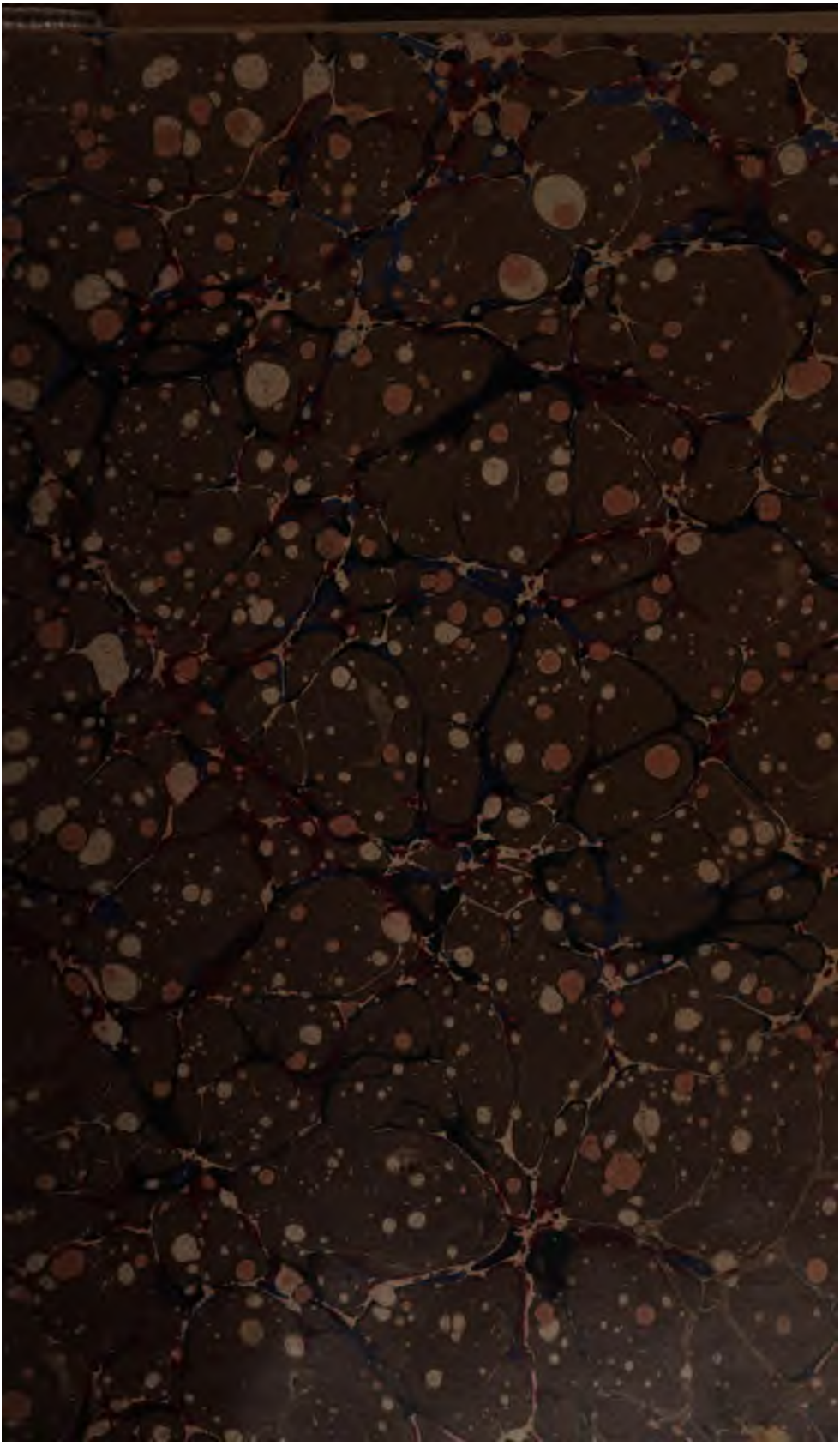

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OF THE

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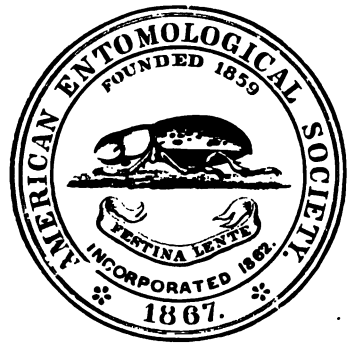

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TRANSACTIONS

OF THE

AMERICAN ENTOMOLOGICAL SOCIETY.

VOLUME XXV.

THE SPECIES OF PSEN INHABITING AMERICA NORTH OF MEXICO.

BY WILLIAM J. FOX.

The present paper is the result of some months study of these insects. Much difficulty has been encountered in the work by the want of distinct characters in many of the species which necessitated the using, in some instances, of certain differences, which, in other genera, would be passed by as valueless for determination. The writer is, therefore, unable to present the work with the same degree of satisfaction as other circumstances might have conduced. It is, however, the first monographic work on the genus, at least of the American species, which fact may give it a standing in the literature of hymenopterology.

The author begs to express his thanks to Mr. Samuel Henshaw for the opportunity of examining some of Packard's types.

FEMALES.

1. Pygidial area as a rule narrow, with large punctures, and more or less depressed, scarcely margined laterally; flagellum at most testaceous, rarely reddish beneath.....2.
   Pygidial area broad and convex, without large punctures, sharply margined laterally; flagellum usually reddish beneath.....12.
2. Head with an unusually large process at base of antennæ (second and third submarginal cells each receiving a recurrent nervure).....3.
   Head with a small tubercle at base of antennæ which usually sends out a slender raised line extending upward.....4.
3. Petiole as long as hind femora, narrowed from middle to base, above with a single furrow which extends from base to middle, above at apex with a depression; hind ocelli bounded laterally by a deep, oblique furrow.

frontalis.

Petiole shorter than hind femora, strongly trisulcate above, the sulci reaching the apex; no distinct furrow in the vicinity of ocelli .....**trisulcus.**

4. Petiole above with three very strong sulci (both recurrent veins received by second submarginal cell).....5.

Petiole above not or scarcely sulcate, long, rather curved; pygidium carinated down middle (?except in *fuscipes*).....9.

5. Front and clypeus with very dense, long silvery pubescence .....6.

Front and clypeus with sparse, short, silvery pubescence .....7.

6. Petiole slender, not much widened apically; enclosure at base of middle segment without an inner triangular smooth area; head above with strong separated punctures; abdomen elongate; mesopleuræ punctato-striate throughout .....**cylindricus.**

Petiole robust, rather distinctly widened apically; enclosure at base of middle segment with an inner triangular smooth area; head not so strongly punctured; abdomen ovate; mesopleuræ not striated medially; posterior surface of middle segment with almost regular transverse rugæ which terminate laterally at a vertical ridge .....**regularis.**

7. Head with fine, separated punctures .....8.

Head closely and rather coarsely punctured, the occiput and front striato-punctate .....**mixtus.**

8. Posterior surface of middle segment covered by large, deep, fossæ; petiole robust, about as long as hind femora.....**niger.**

Posterior surface of middle segment covered by large, shallow fossæ; petiole slenderer, a little longer than hind femora .....**leucopus.**

9. Dorsulum coarsely striato-punctate.....10.

Dorsulum and head finely punctured; face and clypeus with pale golden pubescence; antennæ short, clavate; legs reddish testaceous.**fuscipes.**

10. Petiole thick, flat above, distinctly broadened apically; longitudinal folds on dorsulum very distinct .....11.

Petiole rather slender, subconvex above, widened a little apically; folds on dorsulum not very strong; nervures testaceous; mesopleuræ with separated punctures .....**simplicicornis.**

11. Mesopleuræ rugose-punctate; scutellum sculptured like dorsulum, coarsely striato-punctate; base of tibiæ and tarsi pale testaceous; nervures testaceous.....**Kohlii.**

Mesopleuræ and scutellum with distinct punctures; nervures and legs entirely black.....**punctatus.**

12. Ocelli forming a triangle, the space between hind pair never much more than equaling that between them and eyes.....13.

Ocelli forming a curved line, the space between hind pair much greater than that between them and eyes (a recurrent vein received by the second and third submarginal cells) .....22.

13. Second and third submarginal cells each receiving a recurrent vein; legs and abdomen except petiole, red.....**monticola.**

Second submarginal cell receiving both recurrent veins .....14.

14. Petiole longer than the first segment; if not, then it is strongly trisulcate.15.

Petiole at most as long as the first segment, generally shorter .....21.

15. Petiole fully as long, or longer than the hind femora .....16.

Petiole barely as long, at any rate not longer than hind femora .....19.

16. Dorsulum striato-punctate; abdomen entirely black; all tarsi yellowish. **chalcifrons.**
Dorsulum not striate; abdomen more or less red; tarsi not yellowish.....17.
17. Clypeus transverse, about three times wider than long in the middle; petiole broad, flat above, widened apically, where it is depressed. **argentifrons.**
Clypeus somewhat hexagonal, not three times wider than long in the middle; petiole rather slender, convex above, scarcely widened apically.....18.
18. Sculpture of middle segment unusually fine and even, the posterior surface finely striated; petiole slender, not sulcate above.....**Cressonii.**
Sculpture of middle segment coarse, but not unusually so, the posterior surface rugoso-reticulate; petiole stouter, bisulcate above.....**borealis.**
19. Petiole at most bisulcate, rather slender; clypeus at most bidentate.....20.
Petiole deeply trisulcate above, rather broad; clypeus 4-dentate, the medial teeth largest.....**clypeatus.**
20. Clypeus three times broader than long; sculpture of posterior surface of middle segment rather coarse.....**pauper.**
Clypeus not more than twice broader than long; sculpture of posterior surface of middle segment more subtile.....**unicinctus.**
21. Sculpture of middle segment fine; petiole about half as long as hind femora, convex above, scarcely widened apically.....**proximus.**
Sculpture of middle segment coarse; petiole about two-thirds as long as hind femora, flat above, widened and depressed apically.....**basirufus.**
22. Abdomen black, with bluish reflection, apical margin of segments testaceous; mesopleurae rugoso-punctate.....**tibialis.**
Abdomen more or less red; mesopleurae with large, sparse punctures. **suffusus.**

MALES.

1. Petiole distinctly trisulcate above.....2.
Petiole not trisulcate above.....8
2. Entirely black.....3.
Apex of first and base of second abdominal segment red.....**clypeatus.**
3. Antennae unusually long, longer than head and thorax.....4.
Antennae stouter, not or but little longer than head and thorax.....5.
4. Flagellum scarcely dentate beneath, not pale; tarsi whitish: petiole deeply sulcate.....**longicornis.**
Flagellum with joints 4–6 distinctly dentate or nodose beneath; tibiae, except medially, and tarsi yellowish; sulci of petiole shallow.....**mellipes.**
5. Enclosure of middle segment with a central smooth area.....6.
Enclosure of middle segment with a smooth area, but with transverse striations medially.....7.
6. Petiole very robust; tarsi dark testaceous; posterior surface of middle segment scarcely depressed.....**niger.**
Petiole rather slender, much slenderer than in *niger*; tarsi whitish; posterior surface of middle segment depressed or concave.....**leucopus.**
7. Antennae shorter than head and thorax; sculpture of middle segment finer than in the allied species, the enclosure large, greatly drawn-out apically, so that it includes almost two-thirds of the length of the segment; head with separated punctures.....**cylindricus.**

Antennæ as long, or slightly longer than head and thorax, sculpture of middle segment coarsely rugoso-reticulate, the enclosure about as usual; head above closely punctured ..... **mixtus.**

8. Dorsulum coarsely striato-punctate ..... 9.
Dorsulum otherwise sculptured ..... 10.

9. Flagellum thick, reddish basally, nodose beneath from joint 3 ..... **Kohlii.**
Flagellum slender, not reddish, not nodose ..... **simplicicornis.**

10. Ocelli forming a curved line, the space between hind pair much greater than that between them and eyes (a recurrent vein received by the second and third submarginal cells) ..... **tibialis.**
Ocelli forming a triangle, the space between hind pair never much more than equaling that between them and eyes ..... 11.

11. Second and third submarginal cells each receiving a recurrent vein; abdomen, antennæ and most of legs reddish ..... **monticola.**
Second submarginal cell receiving both recurrent veins ..... 12.

12. Antennæ slender, long, scarcely thickened apically ..... **argentifrons.**
Antennæ shorter, more or less clavate ..... 13.

13. Petiole of abdomen distinctly longer than hind femur; flagellum short, strongly clavate, the basal joint rather distinctly dentate beneath. **Cressonii.**
Petiole of abdomen not longer than hind femur ..... 14.

14. Petiole of abdomen flat above, not convex: head strongly and closely punctured. **basirufus.**
Petiole of abdomen rounded or convex above ..... 15.

15. Petiole of abdomen as long as, or nearly as long as hind femur ..... 16.
Petiole shorter than hind femur ..... 17.

16. Antennæ as long as head and thorax ..... **borealis.**
Antennæ stouter, shorter than head and thorax ..... **pauper.**

17. Abdomen elongate, clavate, *Trypoxylon*-like; enclosure of middle segment closely granulate ..... **granulosus.**
Abdomen otherwise shaped ..... 18.

18. Legs more or less testaceous ..... 20.
Legs entirely black ..... 19.

19. Petiole about half as long as hind femur; second submarginal cell triangular, the first and second transverso-cubital veins uniting above. **gregarius.**
Petiole nearly two-thirds as long as hind femur; second submarginal cell with the transverso-cubital veins separated above ..... **proxima?**

20. Abdomen entirely black, shining; length 8 mm. or over ..... **maculipes.**
Abdomen more or less red; length under 6 mm ..... 21.

21. Middle segment coarsely rugoso-reticulate; antennæ rather stout and clavate, stouter than head and thorax, entirely testaceous; legs testaceous; abdomen short and ovate ..... **cingulatus.**
Middle segment rugose, but not reticulate; antennæ slenderer, less clavate, as long as head and thorax, pale beneath toward apex; tibiæ and tarsi more or less testaceous; abdomen slender, elongate ..... **unicinctus.**

1. Group **frontalis** (=*Pseudus* Kohl.)

1. **Psen frontalis** n. sp.

♀.—Head with strong, separated punctures; front between antennæ with a strong production or prominence which extends up in the form of a carina, and

terminates before the anterior ocelli: clypeus subconvex, rather suddenly shortened, and bidentate medially on anterior margin; each ocellus bounded outwardly by a strong pit or groove, the space between hind pair greater than that between them and eyes; antennæ short and robust, first joint of flagellum longer than second, the scape not as long as the three following joints united; dorsulum and scutellum with strong, separated punctures, those on mesopleuræ feebler; middle segment with a series of parallel strong folds from side to side, interrupted in the middle, however, by a broad furrow, which has transverse folds and runs gradually narrowing, nearly to the apex, the remainder of middle segment coarsely and irregularly rugose; legs clothed with fine hairs, but not spinose; abdomen shining, petiole as long as hind femora, narrowed from base to middle, above shining, with a single furrow on basal half; pygidium small, not distinctly margined laterally; wings subhyaline, iridescent, nervures dark, second recurrent vein received by the third submarginal cell. Black; flagellum beneath, tegulæ tarsi and fore tibiæ anteriorly, testaceous; face and front with silvery pubescence; head and thorax with short, pale fuscous pubescence. Length 6–7 mm.

Utah; Las Cruces, New Mexico (Cockerell).

2. **Psen trisulcus** n. sp.

? Psen leucopus Packard (non Say), Pr. Ent. Soc. Phil. vi. 399 (in pt.), ♀. 1867.

♀.—Head with distinct, separated punctures, less strong than in *frontalis;* front similarly produced; clypeus flat, strongly bidentate; ocelli with a feeble furrow on each side, space between hind pair somewhat greater than that between them and eyes; antennæ slenderer than in *frontalis*, the first joint of flagellum scarcely longer than second, the scape longer than the three following joints united; dorsulum finely striated apically; middle segment as in *frontalis*, but the medial furrow shorter; abdomen shining, petiole shorter than hind femora, above strongly trisulcate. Otherwise as in *frontalis*. Length 7 mm.

New Hampshire. One specimen. This is probably the species described by Packard as the female of *leucopus* Say, which it is not.

2. Group **niger**.

Pygidium (♀) narrowed and acute at apex, margined laterally and covered with distinct, separated punctures. Petiole trisulcate above. Antennæ (♂) long and slender, not at all clavate, the flagellum in both sexes, as a rule, never very pale beneath. Recurrent veins both received by second submarginal cell. Cubital vein of hind wings originating distinctly before apex of submedian cell. Front at most sending off a slender carina which runs to or near the anterior ocellus. Tibiæ spinose.

3. **Psen cylindricus** n. sp.

♀.—Head with strong, separated punctures, closest on front and occiput, where, in addition, there are some fine striæ; face and clypeus with dense silvery pubescence, the clypeus obtusely bidentate in the middle of anterior margin; space between hind ocelli distinctly less than that between them and eyes, the hind pair connected by a strong furrow which bounds them posteriorly; the head behind them somewhat raised; antennæ clavate, tolerably slender, the first joint

of flagellum more than one-third longer than the second; scape concave beneath, about as long as first joint of flagellum; dorsulum with strong, separated punctures, those on the mesopleuræ finer and closer and mingle with fine striæ; middle segment with a large triangular basal enclosure, which is drawn-out almost to apex, and bears oblique and transverse coarse folds, remainder of middle segment rugoso-reticulate, but more finely than usual, on the sides coarsely striated; legs brownish, tarsi testaceous, calcaria yellowish, tibiæ tolerably spinose; abdomen elongate, shining, petiole rather slender, longer than hind femora, trisulcate above, pygidium indistinctly raised down middle, with large punctures; wings subhyaline, iridescent, nervures dark: head and thorax with pale fuscous pubescence, that on legs silvery; abdomen with silvery pile; flagellum pale beneath. Length 8 mm.

♂.—Resembles the ♀; antennæ elongate, slender; first joint of flagellum hardly one-third longer than second; scape stout; thorax perhaps a little more finely sculptured than in the ♀; legs scarcely spinose; petiole of abdomen about as long as hind femora; flagellum pale beneath. Length 7 mm.

Arizona. Two specimens. A slenderer insect than *P. niger*.

4. **Psen niger** Pack.

Psen niger Packard, Proc. Ent. Soc. Phil. vi, 399, ♀ (excl. ♂), 1867.

♀.—Head less strongly punctured than in *cylindricus*, without any trace of striæ; face and clypeus with short, sparse, silvery pubescence and grayish pile, the clypeus distinctly bidentate; space between hind ocelli about one-third less than that between them and eyes; dorsulum with strong, separated punctures, those on the mesopleuræ extremely feeble, in fact the mesopleuræ are nearly smooth, except basally and apically; triangular basal enclosure of middle segment not very large, and scarcely drawn-out apically, containing a smaller triangular smooth enclosure in the middle, on each side of which there are strong folds; the posterior surface of the middle segment is coarsely rugoso-punctate, more so than in *cylindricus*, and is concave, on the sides with coarse folds or striæ; abdomen elongato-ovate, petiole robust, about as long as hind femora, strongly trisulcate above; mesopleuræ beneath with silvery pile. Length 8 mm.

♂.—Head more closely punctured, especially on front; face and clypeus with dense silvery pubescence; space between hind ocelli equal to about half of that between them and eyes; antennæ (flagella missing); thorax with dorsulum rather finely and closely punctured; middle segment very coarsely rugose, the basal enclosure larger; petiole longer than hind femora. Length 8 mm.

Virginia; Canada. The silvery pubescence of front and clypeus is much sparser than in *cylindricus* or *regularis*. Packard had confused the sexes of two species under *niger*, and I have retained as *niger* that which, in my opinion, best befits the name.

5. **Psen regularis** n. sp.

♀.—Head strongly and distinctly punctured, closely on front; face and clypeus with dense, rather long, silvery pubescence, the clypeus not or indistinctly bidentate; space between hind ocelli more than one-third less than that between them and eyes; antennæ (flagella missing); punctures of dorsulum stronger than in *niger*; enclosure of middle segment larger than in *niger*, with a similar central smooth enclosure, on each side of which the folds are stronger and more obvious;

posterior surface of middle segment depressed, bounded laterally by a strong ridge converging above; within the space marked by these ridges the surface bears five or six transverse, rather regularly placed folds, which are separated medially by a longitudinal furrow; sides of middle segment rugose, abdomen ovate, robust; petiole stout, distinctly widened posteriorly, perhaps somewhat longer than hind femora. Length 8 mm.

New Jersey. One specimen. The sculpture of the posterior surface of middle segment and densely pubescent face and clypeus readily distinguish this species.

6. **Psen mixtus** n. sp.

♀.--Head very closely, though distinctly punctured, the occiput and front especially, striato-punctate; clypeus and face without long pubescence, covered with a thin silvery gray pile, the clypeus obtusely bidentate; dorsulum with strong separated punctures, closer and finer anteriorly, the mesopleuræ finely striato-punctate throughout; middle segment with a large basal area, which bears both oblique (laterally) and transverse (apically in the middle) rugæ; posterior surface rugoso-reticulate, depressed medially, not bounded by outer ridges laterally; sides with coarse striæ or folds; legs black, calcaria yellowish; abdominal petiole slenderer than in *niger* or *regularis*, not much widened apically, about as long as hind femora. Length 7.5-9 mm.

♂.—Antennæ elongate, slender, not pale beneath; head sculptured as in ♀; dorsulum distinctly punctured, but more finely, the sculpture of mesopleuræ also finer; middle segment indistinctly bounded by a lateral ridge; abdominal petiole as in the ♀, the petiole much more robust than in the ♂ of *cylindricus*, as is, in fact, the whole insect. Length 7 mm.

Washington; Moscow, Idaho, (Aldrich); Mt. Hood, Oregon; California. Four female and twelve male specimens. The closely punctured head separates this species at once from its allies. A series of males from Mt. Hood are apparently slenderer, with legs brownish, but can hardly be separated as a species. One male specimen has the first recurrent vein interstitial with the first transverso-cubital vein.

7. **Psen leucopus** Say.

Psen leucopus Say, Boston Journ. Nat. Hist. i, 370, ♀ ♂, 1837; LeConte, Complete Writings Th. Say, ii, 753, 1859.

Psen leucopus Packard, l. c., p. 398, ♀ ♂, 1867.

Psen elongatus Packard, l. c., p. 400, ♂ [non ♀].

♀.—Head with distinct separated punctures, the front distinctly striato-punctate; face and clypeus with a thin silvery gray pile, the clypeus obtusely bidentate; dorsulum with distinct separated punctures, the mesopleuræ apparently very finely striated and with sparse shallow punctures, the striæ seemingly absent medially; middle segment with a large triangular enclosure drawn out into a furrow behind, and with a smaller triangular smooth area in the middle, on each side of which there are five or six coarse oblique folds; remainder of middle segment rugoso-reticulate, on the sides coarsely striated, the posterior surface distinctly depressed medially, and indistinctly bounded by lateral ridges; ab-

domen ovate, petiole widened somewhat apically, longer than the hind femora. Length 7-8 mm.

♂.—Face and clypeus with dense silvery pubescence; head more finely punctured; antennæ elongate, slender, not pale beneath; dorsulum finely punctured; mesopleuræ finely and closely punctured throughout; middle segment much more coarsely sculptured than in ♀, the posterior surface with deep foveæ or coarsely reticulated, strongly concave medially so that it presents two convexities, one on each side; petiole of abdomen distinctly longer than hind femora; tarsi whitish. Length 6 mm.

Virginia; Illinois: Algonquin (Nason); New Hampshire.

Psen elongatus Packard, the type specimen of which is a male and not female as described by Packard, does not seem to differ substantially from *leucopus*.

8. **Psen longicornis** n. sp.

♂.—Head rather closely and finely punctured, the front distinctly striated; face and clypeus with dense silvery pubescence; space between hind ocelli barely equal to half of that between them and eyes; antennæ very long, slender, not pale beneath, decidedly longer than head and thorax, joints 2-7 beneath narrowed basally, so that they present a somewhat serrate appearance, first joint nearly twice as long as the second; dorsulum and mesopleuræ distinctly striato-punctate; basal triangular enclosure of middle segment large, drawn out apically into a furrow, which runs to apex of posterior face, and with a central smooth area, on each side of which are some short rugæ; posterior face of middle segment rugoso-reticulate, but little depressed and without lateral ridges; sides rugosely striated; tarsi, except apical joint, white; abdomen ovate, the petiole slender, longer than hind femur and trochanter united. Length 6.5 mm.

Florida (Mrs. Slosson). One specimen.

9. **Psen mellipes** Say.

Psen mellipes Say, Boston Journ. Nat. Hist. i. 369, ♀, 1837.

"♀.—Black, with a silvery reflection; antennæ at base, tibiæ and tarsi piceous. Inhabits Indiana. *Body* black; *head* beneath antennæ yellowish silvery; *occiput* with a silvery reflection; *antennæ* to the seventh joint honey-yellow; *mandible* piceous; thorax with longitudinally confluent punctures, a slender transverse line before, four or six obsolete spots near the scutel and two large obvious ones near the insertion of the petiole of the abdomen; *wings* hyaline; nervures black; stigma brown; second cubital cellule receiving both recurrent nervures; *abdomen* immaculate, with a few hairs towards the tip; petiole as long as the posterior tarsi, or rather longer, arcuated, piceous; *tibiæ* and *tarsi* piceous or honey-yellow; anterior pair with a dense, short, golden hair. Length nearly eleven-twentieths of an inch."

♂.—Head finely punctured, closely and strongly on the front, which is not striated; face and clypeus with dense silvery pubescence, space between hind ocelli equal to more than half of that between them and eyes; antennæ long and slender, longer than head and thorax, the flagellum, except last joint, yellowish beneath, joints 4-6 prominent beneath, almost dentate; dorsulum with large punctures and fine longitudinal striæ; tegulæ reddish; basal enclosure of middle segment drawn out into a furrow at apex, which runs to apex of posterior face,

without a smooth medial area, and bearing oblique (laterally) and irregular (medially and apically) rugæ; posterior face more regularly and finely rugoso-reticulate than in *longicornis;* sides comparatively finely striated; tips of femora and tibiæ and tarsi yellowish, the tibiæ darker medially; petiole of abdomen slender, not longer than hind femur and trochanter united, the medial furrow of upper surface not as well marked in the preceding species. Length 6 mm.

Indiana (Say); New York. I have not seen the female of this species, but have no doubt that the single male specimen before me is the same.

3. Group **Kohlii.**

This group has the characteristics of 2. Group, except that the petiole is unusually long and not sulcate above. The sculpture of head and thorax is very coarse, except in one species; clypeus tridentate in ♀.

10. **Psen Kohlii** n. sp.

♀.—Head with deep, separated punctures, those on the front closer and stronger; furrow back of ocelli very deep; face and clypeus with dense silvery pubescence, the fore margin of clypeus in the middle with three large teeth; space between hind ocelli slightly less than that between them and eyes; antennæ clavate, joints 2-5, or 6, fulvous, the first joint of flagellum nearly as long as the two following joints united; dorsulum very coarsely striato-punctate, as is likewise the scutellum and metanotum (post-scutellum), the mesopleuræ more closely so; enclosure of middle segment rather short, with a diamond-shaped medial smooth area, on each side of which lies another smooth quadrate area, and then further toward sides are four or five short rugæ; posterior face of middle segment with dense, pale pubescence apically, deeply sulcate down middle with a strong depression at apex, coarsely rugoso-reticulate, the reticulation extending somewhat on the sides; legs black, knees reddish, tarsi pale testaceous; abdomen fusiform, pygidium strongly carinated down middle, petiole longer, hind femur and trochanter flattened above, polished and distinctly widened at apex, reddish; wings subhyaline, somewhat reddish purple apically. Length 10 11 mm.

Var.—Petiole black; central area of enclosure of middle segment irregular, with several rugæ.

♂.—Colored like the ♀, but more coarsely sculptured; antennæ about as long as head and thorax united; joints 3-10 of flagellum strongly nodose beneath, the first joint about one-third longer than second; enclosure of middle segment with coarse, irregular rugæ medially, the smooth central area, therefore, absent; sides of middle segment toward base rugose; petiole longer than in female; legs brownish; second cubital cell narrowed at least two-thirds above. Length 10 mm.

Philadelphia, Pa.; Virginia. Four specimens. It gives me great pleasure to dedicate this fine species to my esteemed friend and colleague, Franz Friedrich Kohl, of Vienna, Austria.

11. **Psen punctatus** n. sp.

♀.—Head with distinct, separated punctures, much less coarse than in *Kohlii*, those on occiput and cheeks especially, fine; front and clypeus with dense silvery pubescence; antennæ rather strongly clavate; flagellum more or less ful-

vous basally; post-ocellar furrow becoming obsolete medially; space between hind ocelli about equal to that between them and eyes; dorsulum coarsely punctured and with some strong striæ, but not so coarsely striato-punctate as in *Kohlii;* scutellum with large punctures, not striated; mesopleuræ strongly and rather evenly punctured, not striated; enclosure of middle segment large, but not well marked, with irregular rugæ medially, those at sides oblique, and at apex transverse; posterior face of middle segment not as coarsely rugoso-reticulate as in *Kohlii*, with silvery pubescence apically; pronotum, sides of scutellum, post-scutellum also with silvery hair; legs black, calcaria whitish; petiole of abdomen longer than in *Kohlii*, slenderer, not so much widened at apex, and subconvex above; pygidium raised down middle, not distinctly carinated, with large punctures on each side; wings clear; nervures dark. Length 11 mm.

Colorado (Gillette). Two specimens.

12. **Psen simplicicornis** n. sp.

Psen niger Packard, l. c., p. 399, ♂ (excl. ♀).

♀.—Head with distinct separated punctures, still less coarse than in *punctatus;* face and clypeus with dense silvery pubescence; space between hind ocelli about equal to that between them and eyes; dorsulum with coarse punctures and striæ, the latter, however, not as coarse as in *Kohlii* and *punctatus;* scutellum with large punctures, not striate; mesopleuræ strongly and rather closely punctured, not striated, the punctures not so even as in *punctatus;* middle segment with a large enclosure drawn out at apex into a deep furrow which divides the posterior face, with a central diamond-shaped area, which contains some irregular rugæ, or may be nearly smooth; posterior face of middle segment rugoso-reticulate, more coarsely than in *punctatus*, and becoming less coarse apically; pronotum above, sides of thorax, scutellum and post-scutellum at sides, and middle segment apically with silvery pubescence; legs black, knees, tarsi and calcaria yellowish testaceous; petiole of abdomen rather slender, subconvex above, but little widened at apex, distinctly longer than hind femur and trochanter; pygidium not distinctly raised or carinated medially, strongly punctured laterally; wings darker than in *punctatus*, nervures testaceous. Length 10 mm.

♂.—Front very coarsely and closely punctured; antennæ rather slender, about as long as head and thorax united, the flagellum not dentate or nodose; dorsulum closely sculptured; enclosure of middle segment with the central area narrowed into a furrow, the lateral rugæ wider apart than usual; posterior face covered with great coarse pit-like areas; sides at base rugose; legs brownish, tarsi paler; petiole comparatively longer than in ♀; second submarginal cell nearly square, narrowed barely one-third above. Length 8 mm.

Virginia; North Carolina. Three specimens.

13. **Psen fuscipes** Pack.

Psen fuscipes Packard, l. c., p. 402, ♀, 1867.

♀.—Head with tolerably fine and close, though distinct punctures, much more than in the other species of this group; face and clypeus with dense, pale golden pubescence; space between hind ocelli perhaps slightly less than that between them and eyes; clypeus hardly tridentate, the median tooth indistinct; antennæ short, not longer than head and that portion of thorax anterior to scutellum, clavate; dorsulum finely punctured, shining; scutellum likewise; mesopleuræ coarsely striated above and posteriorly, elsewhere apparently smooth and shining; enclosure of middle segment not so well marked as in the other species of the

group, filled with coarse, rather close rugæ, those at apex transverse; posterior face of middle segment very coarsely rugoso-reticulate, divided by a median sulcus, sides of middle segment with some coarse folds, nearly smooth at base; legs reddish testaceous; veins of wings testaceous.

Massachusetts. The only specimen I have seen of this species is the type, which unfortunately lacks the abdomen. Packard describes this as follows: "Body of the abdomen longer than the head and thorax together, being unusually long and slender, ovate lanceolate, pedicel nearly as long as abdomen is wide, grooved deeply laterally, highly polished; abdomen with the rings slightly coarctate, sutures well impressed, hind edge of second, third and fourth rings obscurely and narrowly blood-red; tip acute, with a narrow, long, subtriangular, well-marked, flattened surface. Length of the body .36."

P. fuscipes is placed in this group provisionally. In the subtile punctuation of head and dorsulum it is isolate from the other species of the group. The examination of perfect specimens may show differences requiring the relegation of this species to another group.

4. Group monticola.

Pygidium (♀) broad, not greatly narrowed apically or much depressed, margined laterally and with large punctures. Petiole above at most indistinctly sulcate near the sides, on the sides themselves not deeply sulcate. Second recurrent vein received by the third submarginal cell, the first recurrent by the second cell. Cubital vein of hind wings originating distinctly before the apex of submedian cell. Antennæ (♂) elongate, slender. Front with a slender carina. Tibiæ spinose.

14. **Psen monticola** Pack.

Mimesa monticola Packard, l. c., 407, ♂.

♀.—Head finely punctured, closest on front; face and clypeus with tolerably dense silvery pubescence; anterior margin of clypeus squarely produced in the middle and subtruncate; space between hind ocelli slightly less than that between them and eyes, not connected by a furrow; flagellum testaceous beneath, clavate; mandibles yellowish medially; dorsulum with tolerably strong, separated punctures, shining, not striated; mesopleuræ less strongly punctured; enclosure of middle segment large, with strong rugæ, the medial area reduced to a furrow, which is broadened apically; posterior face of middle segment deeply sulcate down the middle, rugoso-reticulate, but not very coarsely, clothed with silvery pubescence, as are also the mesopleuræ, pronotum and cheeks; tips of femora, tibiæ and tarsi entirely fulvous, sometimes the femora and trochanters also; abdomen red, petiole black; pygidium broad and flat, with large, sparse punctures; petiole at most as long as hind femur and trochanter, above indistinctly sulcate near sides, at apex widened and depressed; wings clear, second submarginal cell subquadrate, narrowed barely one-third above, and receiving the first recurrent nervure between base and middle, third submarginal receiving the second recurrent vein near base. Length 9-10 mm.

♂.—Antennæ elongate, entirely reddish testaceous, distinctly longer than head and thorax united, joints 4-7 of flagellum slightly prominent beneath; clypeus scarcely produced as in ♀; middle segment more coarsely sculptured than in ♀ the petiole of abdomen somewhat longer and slenderer; coloration and venation almost as in ♀. Length 9 mm.

Philadelphia, Pa., August 4 (C. W. Johnson); New Hampshire: Mt. Washington (Packard). Three specimens. Easily distinguished by the bright red abdomen and venation. According to Packard the last two segments of abdomen in his specimen were black.

5. Group **argentifrons.**

Pygidium (♀) broad, not much narrowed apically, closely punctured, not depressed. Petiole of abdomen varying in length and form in the various species. Both recurrent veins received by the second submarginal cell. Cubital vein of hind wings originating distinctly before the apex of the submarginal cell. Tibiæ spinose. Antennæ (♂) elongate or subclavate.

15. **Psen argentifrons** Cress.

Mimesa argentifrons Cresson, Proc. Ent. Soc. Phila. v, 487, 1865.

♀.—Head rather finely and evenly, though not very closely, punctured: face and clypeus densely silvery, the clypeus with a transverse prominence just before anterior margin, the latter strongly sinuous, in the middle having the appearance of being tridentate; space between hind ocelli about equal to that between them and eyes; flagellum fulvous beneath, first joint about one-quarter longer than second; in length the antennæ are greater than the head and that portion of the thorax anterior to the middle segment; dorsulum with rather strong, separated punctures, the mesopleuræ more subtilely punctured, striated basally and apically; enclosure of middle segment large, with no central area, lateral rugæ coarse, the apical portion with transverse rugæ; posterior surface of middle segment rugoso-reticulate, depressed medially; the sides at base strongly striated; tarsi testaceous; abdomen with apex of first segment, the second entirely and most of third, reddish; petiole rather flat above, depressed at apex, furrowed near the sides but not deeply, in length somewhat longer than hind femur, on the sides with two wide, shallow furrows; second submarginal cell not narrowed one-half above. Length 9-10 mm.

♂.—Head closely punctured; antennæ elongate, longer than head and thorax united; middle segment much more coarsely sculptured than in ♀, the rugæ of the enclosure irregular; tibiæ and tarsi reddish; petiole more deeply sulcate, and with a trace of a medial furrow above apically. Length 8-9 mm.

Colorado. The specimens from Illinois, referred to by Packard, probably represented another species, and perhaps *Cressonii.*

16. **Psen Cressonii** Pack.

Mimesa Cressonii Packard, Proc. Ent. Soc. Phil. vi, 405, ♀. 1867.

Mimesa denticulata Packard, ibid. 406, ♂, 1867.

♀.—Head more distinctly punctured than in *argentifrons;* face and clypeus sparsely silvery; clypeus convex, strongly punctured, long, its length equal to decidedly more than half its breadth, fore margin broadly subtruncate; space

between hind ocelli distinctly greater than that between them and eyes; antennæ shorter than head and that portion of the thorax anterior to the middle segment dorsulum with strong, separated punctures; mesopleuræ medially finely striato-punctate, above strongly striated; enclosure of middle segment comparatively small, with close, tolerably fine rugæ, which are much finer and more closely set than in *argentifrons*, sulcate medially; posterior face of middle segment finely striated, deeply sulcate down middle; sides closely and finely punctured; abdomen with first three segments and base of fourth, reddish; petiole comparatively slender convex and not sulcate above, on the sides indistinctly sulcate, slightly shorter than hind trochanter and femur; second submarginal cell narrowed more than one-half above. Length 9-10 mm.

♂.—Antennæ fulvous, flagellum strongly clavate, with joints 2-4 nodose or obtusely dentate beneath; tibiæ and tarsi testaceous; petiole distinctly longer than hind femur and trochanter; face and clypeus densely silvery; red color of abdomen rarely extending beyond third segment. Length 8-9 mm.

New Jersey: Camden County (June); Delaware; Illinois; Colorado; Montana. Quite distinct by the sculpture of middle segment and form of male antennæ.

17. **Psen chalcifrons** Pack.

Psen chalcifrons Packard, l. c., 401, ♀. 1867.

♀.—Head finely and closely punctured, on the front much more coarsely; face and clypeus silvery; clypeus short, its length much less than half its breadth, the anterior margin in the middle truncate; space between hind ocelli equal to but little more than half that between them and eyes; antennæ reddish, darker above, flagellum subclavate; dorsulum longitudinally striated medially, and with large punctures; mesopleuræ finely striated, above apparently smooth; enclosure of middle segment with a median diamond-shaped area, on each side of which the rugæ are oblique and well marked; posterior face sulcate medially, rather closely rugoso-reticulate; legs black, with the fore and medial tibiæ and base of hind pair yellowish, tarsi whitish; abdomen entirely black; petiole about as long as hind femur, rather robust above, sulcate near each side, on sides not sulcate; wings unusually iridescent; second submarginal cell small, narrowed somewhat more than one-half above. Length about 6.5 mm.

Illinois. I have only seen the unique type specimen of this species, which seems to be quite rare.

18. **Psen borealis** Smith.

Mimesa borealis Smith. Cat. Hym. Brit. Mus., iv, 431, ♂, 1856.

♀.—Head with tolerably fine and close punctures; face silvery; clypeus convex, punctured, subtruncate anteriorly, its length perhaps a little greater than half its width; space between hind ocelli equal to less than that between them and eyes; antennæ shorter than head and that portion of thorax anterior to the middle segment, the flagellum stout; dorsulum sparsely punctured; mesopleuræ finely striated, more strongly above and apically; enclosure of middle segment with a medial smooth area, with some irregular rugæ in the middle apically, those toward the sides longitudinal; posterior face rugoso-reticulate medially, distinctly sulcate; sides finely punctured toward base; abdomen with apex of first, second entirely, and base of third segment, reddish; petiole shorter than hind femur, above near each side distinctly sulcate, on the sides with a single deep sulcus; second submarginal cell narrowed about two-thirds above. Length 7-8 mm.

♂.—Clypeus shorter, subemarginate, silvery; antennæ nearly as long as head and thorax, subclavate, joints 2–5 or 6 of flagellum, prominently rounded beneath; enclosure of middle segment sulcate medially, without an area as in the ♀, the sculpture coarser and more irregular, that of the posterior face very coarse: the latter depressed above medially, and apical the rugæ forming two large, smooth areas; petiole perhaps a little shorter than in ♀; red of abdomen sometimes not extending beyond second segment; tibiæ and tarsi reddish testaceous; width of second submarginal cell at top variable. Length 5–6 mm.

Hudson Bay (Smith); Canada.

19. **Psen pauper** Pack.

Mimesa pauper Packard, l. c., 409, ♂, 1867.

Mimesa paupera Provancher, Nat. Can. xiii, 79, ♀ ♂, 1882.

♀.—Head rather finely and closely punctured; face silvery, the clypeus sparsely; clypeus indistinctly emarginate, its length barely equal to half its width; space between hind ocelli somewhat less than that between them and eyes; antennæ about as in *borealis;* dorsulum more distinctly punctured: enclosure of middle segment with transverse rugæ apically, those toward the sides oblique; posterior face with strong rugæ, near the sides becoming rugoso-reticulate, deeply sulcate down middle; abdomen with apex of first segment and second entirely reddish; petiole about two-thirds as long as hind femur, above strongly sulcate near sides, the latter with a narrow furrow; second submarginal cell narrowed about three-fourths above. Length 7 mm.

♂.—Punctures of the head closer; face and clypeus silvery, the latter considerably smaller, emarginate; antennæ shorter than in *borealis*, considerably shorter than head and thorax, subclavate, the basal joints of flagellum not noticeably prominent beneath; enclosure of middle segment much as in ♀, but the sculpture coarser; posterior face depressed medially, coarsely rugoso-reticulate; sides rugose almost to base; tips of femora, tibiæ and tarsi reddish testaceous; petiole of abdomen slightly slenderer and longer than in ♀, with the furrow of sides stronger; the petiole is distinctly shorter than in ♂ of *borealis;* second submarginal cell narrowed somewhat more than one-half above. Length 5.5–6 mm.

Illinois; Westville, New Jersey, in middle of August.

A series of four males and one female from Montana, South Dakota and Colorado does not seem to differ specifically, although the specimens are larger, the red of legs brighter and that of abdomen extending upon the third segment.

20. **Psen cingulatus** Pack.

Mimesa cingulata Packard, l. c., 410, ♂, 1867.

♂.—Very much like *pauper* in general appearance; antennæ heavier, the flagellum more clavate and not so long; thorax practically as in *pauper;* legs pale testaceous; petiole of abdomen a little shorter than in *pauper*, sulcate laterally, the sides rather distinctly sulcate; first segment testaceous, second reddish; second submarginal hardly narrowed one-half above. Length 5 mm.

Brunswick, Maine, in August. Only the unique type examined. It is very close to *P. pauper*, but its very pale legs will serve in distinguishing it. Its antennæ are testaceous, and the prominence between antennæ is not more prominent than usual.

21. **Psen unicinctus** Cress.

Mimesa unicincta Cresson, Proc. Ent. Soc. Phil. iv, 488. ♂ (non ♀), 1865.

♀.—Head finely and closely punctured; face silvery, the clypeus nude, except laterally, distinctly punctured, its fore margin broadly truncate; space between hind ocelli less than that between them and eyes; antennæ shorter than the head and that portion of thorax anterior to middle segment; dorsulum with subtile punctures; mesopleuræ distinctly striated above and on apical portion; rugæ of enclosure of middle segment oblique, transverse apically; posterior face sulcate down middle, finely rugose, not at all reticulate; sides finely punctured; abdomen with apex of first, the second entirely and most of third segment, reddish; petiole longer than in *pauper*, but still shorter than hind femur, rounded, indistinctly sulcate near each side, on the sides not sulcate; second submarginal cell narrowed more than one-half above. Length 6–7 mm.

♂.—Face and clypeus silvery, the fore margin subemarginate medially; antennæ fully as long as head and thorax, elongato-clavate, basal joints of flagellum indistinctly prominent beneath; rugæ of enclosure of middle segment close, no transverse ones apically, or if present they are indistinct; posterior surface strongly rugose, but not distinctly reticulate; legs black, tarsi testaceous; abdomen with apex of first and second segments entirely, red; petiole but little shorter than hind femur, second submarginal cell narrowed barely one-half above. Length 5.5 mm.

Colorado. The petiole is longer than in *pauper*, and sculpture of middle segment finer. The ♂ differs from *confertus* by finer punctuation of head, etc.

Cresson's type of this species is a male and not a female, as described by him.

22. **Psen clypeatus** n. sp.

♀.—Face and clypeus densely silvery; clypeus with four distinct teeth on anterior margin, the median two by far the larger, and are rather acute and distinctly separated; antennæ longer than the head and that portion of thorax anterior to middle segment, but shorter than head and thorax; dorsulum striato-punctate, distinctly striated posteriorly; mesopleuræ finely punctured; enclosure of middle segment large, with a large, central, smooth area, on each side of which the rugæ are widely separated, several transverse rugæ at apex; posterior surface rugoso-reticulate, depressed medially; sides finely rugose; abdomen with apex of first segment and second entirely, reddish; petiole robust, shorter than hind femur, deeply trisulcate above, on the sides bisulcate. Length 6 mm.

♂.—The male agrees with the female in most points; only the median teeth of clypeus distinct, and they are closer together and much less evident than in ♀; antennæ longer than head and thorax, not pale beneath, joints of flagellum rather irregular: tarsi pale; petiole almost as long as hind femora. Length 5.5 mm.

Nevada; Colorado (Gillette). Two specimens. In its deeply trisulcate petiole this species approaches those of Group *niger*, but the pygidium of female is broad and flat. It differs from all its immediate relatives by the striated dorsulum and form of petiole.

23. **Psen granulosus** n. sp.

♂.—Head rather strongly punctured; face and clypeus silvery, the latter bidentate medially; space between hind ocelli slightly greater than that between

them and eyes; antennæ clavate, entirely testaceous, in length about equal to the head and that portion of the thorax anterior to middle segment; basal joints of flagellum not prominent beneath; dorsulum subtilely punctured; mesopleuræ apparently granulated, or closely striato-punctate, its sculpture indistinct in consequence of silvery pubescence; enclosure of middle segment divided by a furrow, its rugæ fine and very close, with a few transverse ones apically; posterior surface rugose, somewhat granulose above near the enclosure, apically the rugæ become more separated, and there are two smooth areas near insertion of petiole; legs with tarsi testaceous; abdomen claviform, entirely black, with margins of first and second segments testaceous, or with the second segment red; petiole shorter than hind femur, rounded, not sulcate above, and only indistinctly on sides; wings paler than in most species, whitish at base, second submarginal varying; tegulæ testaceous. Length 7 mm.

Montana. Two specimens.

P. granulosus may yet prove to be the male of *proximus*, but it is not probable.

24. **Psen gregarius** n. sp.

♂.—Head closely punctured, but not strongly; face and clypeus silvery; clypeus with fore margin produced a little medially; space between hind ocelli slightly, if anything, less than that between them and eyes; antennæ about as long as the head and that portion of thorax anterior to middle segment, the flagellum clavate, with joints 2–5, or 6, somewhat prominent beneath; dorsulum shining, indistinctly punctured; mesopleuræ subtilely punctured; enclosure of middle segment not well marked, its rugæ distinctly separated, no median furrow or area; posterior face depressed medially, rugose, but rather finely; legs dark, tarsi testaceous; abdomen with apex of first segment and second entirely, reddish; petiole only about half as long as hind femur, rounded, rather slender, indistinctly sulcate near sides, the latter not sulcate; second submarginal cell triangular, the subcubital veins meeting at top. Length 5.5 mm.

Colorado (Gillette). One specimen.

This species has the general appearance of *unicinctus* ♂, and is related to it in some respects. It differs chiefly in the clavate and shorter antennæ, more distinct rugæ of enclosure of middle segment and shape of second submarginal cell. The latter, however, may not be a constant characteristic.

25. **Psen proximus** Cress.

Mimesa proxima Cresson, l. c., 488, ♀. 1865.

♀.—Head closely punctured; front and clypeus silvery; fore margin of clypeus sinuous, or subtruncate; space between hind ocelli about equal to that between them and eyes; antennæ about as long as the head, pronotum and dorsulum, flagellum strongly clavate; dorsulum subtilely punctured; mesopleuræ closely punctured, striated above; enclosure of middle segment with the rugæ very fine and close, with some transverse ones apically, not furrowed; posterior face finely rugose, or with comparatively fine striations, which disappear medially, at which place the posterior face is deeply sulcate; tarsi pale testaceous; abdomen with first segment except base, second and third entirely and most of fourth, reddish; petiole short, rather thick, equal to a little more than half the length

of hind femur, distinctly sulcate above near sides and in addition with a short basal furrow, sides with a strong sulcus; second submarginal cell narrowed about one-half above. Length 7 mm.

Colorado. The length of petiole and sculpture of middle segment and great extent of red on abdomen distinguish this species.

Two specimens from Washington have the abdomen broader, with the red coloration not extending beyond the third segment; and the silvery pubescence of head in front is sparser.

26. **Psen basirufus** Pack.

Mimesa basirufa Packard, l. c., 406, ♀, 1867.

♀.—Head distinctly punctured; very closely on the front; fore margin of clypeus distinctly and roundly emarginate medially; face and clypeus densely pubescent; space between hind ocelli about equal to or slightly less than that between them and eyes; antennæ slightly longer than head, pronotum and dorsulum, flagellum clavate; dorsulum with distinct, separated punctures; mesopleuræ rather finely striato-punctate, more coarsely above; enclosure of middle segment with the rugæ rather coarse, irregular; posterior face of middle segment rather coarsely rugoso-reticulate, the rugæ extending half way on the sides, the latter smooth basally; legs black, tarsi brownish; abdomen with segments 1 and 2 red; petiole thick, flat above, indistinctly sulcate laterally, depressed at apex, about two-thirds as long as hind femur, the sides bisulcate to a greater or less degree; second submarginal cell narrowed about one-half above. Length 8-8.5 mm.

♂.—Head with close punctures, having the appearance of being granulated; space between hind ocelli less than that between them and eyes; clypeus only slightly emarginate; antennæ hardly as long as head and thorax, subfiliform, middle segment more closely rugose than in ♀; base of second segment only reddish; petiole slenderer, about as long as hind femur, otherwise like ♀; legs dark. Length 8 mm.

Maine; British Columbia; Washington; Mt. Hood, Oregon; Nevada; Arizona; Colorado; Montana. Ten examples. It is quite distinct by its robust form, strongly flattened petiole, etc. Had I not examined Packard's type of *Mimesa basirufa*, I should never have considered the specimens before me to be that species. Neither the coloration of abdomen, nor the sulcation of petiole are as described originally.

27. **Psen maculipes** Fox.

Mimesa maculipes Fox, Can. Ent., xxv, 117, ♂, 1893.

♂.—Head very finely and closely punctured; fore margin of clypeus emarginate, or bidentate; face and clypeus densely pubescent; space between hind ocelli about equal to that between them and eyes; antennæ distinctly shorter than head and thorax, longer than head, pronotum and dorsulum, flagellum subclavate, basal joints not prominent beneath; dorsulum shining, subtilely punctured: mesopleuræ strongly striated posteriorly and above, apparently smooth in the middle: middle segment very coarsely rugoso-reticulate; enclosure with coarse parallelo-oblique rugæ, and two transverse ones apically: posterior face depressed; sides coarsely striated; legs with apex of femora, the tibiæ and tarsi

more or less yellowish; abdomen entirely black; petiole tolerably slender, shorter than hind femur, above sulcate laterally, sides not distinctly sulcate; nervures black, second submarginal narrowed more than one-half above. Length 8-8.5 mm.

Southern Florida (Robertson). Another example without locality.

6. Group tibialis.

Pygidium (♀) broad, not depressed. Petiole of abdomen rounded pipe-like, not sulcate in the species so far known. The recurrent veins received respectively by the second and third submarginal cells. Cubital vein of hind wings interstitial. Ocelli almost forming a curved line, so— . ˚ . Legs rather robust, tibiæ spinose. Eyes strongly diverging above.

28. **Psen tibialis** Cress.

Mimesa tibialis Cresson, Tr. Am. Ent. Soc. iv, 488, ♀ ♂, 1872.

♀.—Head distinctly punctured, but not strongly; fore margin of clypeus broadly subtruncate, rather more rounded; face and clypeus densely silvery; ocelli situated in depressions, the space between hind pair much greater than that between them and eyes; flagellum clavate, the length of the antennæ is hardly as long as head and that part of thorax anterior to postscutellum; dorsulum covered with deep, separated punctures, those of scutellum running into rugæ posteriorly; mesopleuræ rugoso-punctate, but not coarsely; enclosure of median segment sulcate medially, with somewhat irregular rugæ, remainder of middle segment with a rather even, not coarse, rugoso-reticulation, except sides at base which are finely striated; posterior surface sulcate down middle; tegulæ, tubercles, tips of femora, base of hind tibiæ, the others entirely, the tarsi, pale yellowish; abdomen black, with a metallic-blue reflection, the apical margins of the segments broadly testaceous; petiole rounded, not sulcate, in length about two-thirds as long as hind femur. Length 7 mm.

Texas; District of Columbia. I have not seen the male of this species, which, according to Cresson's description, does not seem to differ much from the female, except that the abdomen is slender, which in itself is not a reliable character.

29. **Psen suffusus** n. sp.

♀.—Head distinctly punctured, but not strongly; fore margin of clypeus broadly subtruncate, more truncate than rounded; face and clypeus densely silvery; mesopleuræ with the punctures large and sparse, striated posteriorly; enclosure of middle segment smaller than in *tibialis*, with irregular rugæ, not sulcate medially; remainder of middle segment rugoso-reticulate, but not coarsely, except sides at base, which are apparently smooth; tegulæ, tubercles, tips of four anterior femora, four anterior tibiæ entirely, base of hind pair and hind tarsi entirely, or ringed with, whitish; flagellum beneath whitish or reddish; abdomen either with greater portion black, or this is reversed and reddish prevails; this color may be restricted to the second and third segments, or the abdomen may be much suffused with it; petiole rounded, not sulcate, in length about two-thirds as long as hind femur. Length 6-7 mm.

New Mexico: Las Cruces, August 14, and Rincon (Cockerell). Five specimens.

MONOGRAPH OF THE SPECIES OF APHILANTHOPS INHABITING BOREAL AMERICA.

BY S. N. DUNNING.

The material on which this study is based belongs (with the exception of *A. bakeri* Dun. and *A. utahensis* Baker) to the American Entomological Society. I am much indebted to Mr. Wm. J. Fox for assistance rendered—without which I could never have completed this article. To Prof. C. F. Baker my thanks are due for the loan of the types of *bakeri* and *utahensis* ♂ above mentioned.

APHILANTHOPS Patt.

Aphilanthops Patton, Proc. Boston Soc. Nat. Hist. xx, 401 (1880).
Clypeadon Patton, Ent. News, p. 13, 1897.

Eyes entire, parallel inwardly; second submarginal cell receiving recurrent nervure near middle, third receiving recurrent near base; head broader than high, wider than thorax; basal segment not strongly constricted; submedian cell of posterior wings falling far short of the median cell on the externo-medial nervure; ♀ with a broad, flattened enclosure on last dorsal segment.

FEMALES.

Clypeus 5-dentate, pygidium triangular, body subdepressed, antennæ subfiliform, tending to subclavate.
  A small pair of claspers.....**elsiæ.**
  No claspers.
    Third joint of antennæ not longer than 4-5 combined.....**frigidus.**
    Third joint of antennæ longer than 4-5 combined.....**subfrigidus.**
Clypeus not dentate, evenly rounded, pygidium subquadrate, body ovate, antennæ filiform.
  Ground color of head, thorax, legs and abdomen, black.....**taurulus.**
  Ground color of head and thorax black, legs always rufous, and abdomen divided between black and rufous, latter usually predominating.....**quadrinotatus.**
  Ground color rufous throughout.....**utahensis.**

MALES.

Head and thorax extremely hairy.....**hispidus.**
Head and thorax not more than ordinarily hairy.
  Face covered with thick growth of silvery appressed hairs.
    Legs black and yellow, ground color black.

Space between eyes above much greater than their length, the hind ocelli separated by a distance much less than that between them and eyes. **taurulus.**

Space between eyes above but little greater than their length, the hind ocelli separated by a distance about equal to that between them and eyes ..... **laticinctus.**

Legs rufous and yellow.

Ground color rufous, mesothoracic punctures of medium size. **utahensis.**

Ground color black, or black and rufous, mesothorac punctures large and coarse ..... **concinnulus.**

Face more or less hairy, but never thickly so, or appressed.

Clypeus lobed, not dentate.

Ground color yellow, antennæ subfiliform ..... **foxi.**

Ground color black, antennæ filiform ..... **bakeri.**

Clypeus distinctly 3-dentate.

Third joint of antennæ longer than joints 4-5 combined. **subfrigidus.**

Third joint of antennæ not longer than joints 4-5 combined.. **frigidus.**

Aphilanthops frigidus Sm.

Philanthus frigidus Smith, Brit. Mus. Cat. Hym. iv, p. 475, ♂.

Aphilanthops frigidus Patton, l. c., p. 401. 1880. ♂ ♀.

♀.—Length 11-15 mm. Black with yellow markings. Head, except on front, covered with a sparse growth of fine hair; black, except three broad stripes on face (two on eye margins and one below antennal base), and sometimes a line behind eyes, which are yellow, finely and closely punctured; eyes farther apart than their greatest length; ocelli as far from nearest eye-margin as the length of third joint of antennæ, sometimes a barely noticeable smooth shining spot behind; clypeus 5-dentate, sparsely covered with shallow punctures; mandibles piceous, yellow outwardly at base; antennæ subfiliform, scape yellow spotted, flagellum ferruginous at base and at tip of last joint, third joint barely as long as 4-5 combined. Thorax black, a line on collar (usually interrupted) spots on scutellum, postscutellum, posterior angles, tegulæ and spot behind tubercles (all liable to be absent) yellow, covered with a sparse growth of brown hair; mesothorax strongly wrinkled, closely and finely punctured; scutellum more coarsely punctured; metathorax closely and finely punctured, elevation smooth, shining, prominent and not divided by suture, a circular cavity above. Abdomen black, with two large yellow spots on first segment, a band on second narrowly interrupted, like bands on 3, 4 and 5 sometimes connected; finely and closely punctured; a few hairs on first; a somewhat triangular cavity on pygidium containing large shallow punctures; subdepressed; venter black or piceous, a few yellow spots sometimes absent), a few hairs laterally and with large scattered punctures; coxæ black, sometimes yellow spotted, first half (and sometimes almost all) of femora black or piceous, rest yellow; tibia yellow; tarsi yellow, ferruginous at tips. Wings clear, sometimes darkened, nervures ferruginous, light spot before stigma.

♂.—Length 10 mm.; smaller and narrowed, abdomen ovate, not depressed; eyes not as far apart as their greatest length; clypeus 3-dentate; yellow spots on sixth segment and yellow on venter more extended; otherwise as in ♀.

Hab.—Illinois, Massachusetts, Connecticut, New Jersey, Canada, Colorado, Montana. Eleven females and one male. The specimens

from Colorado and Montana show markings very pale yellow. The var. ♀ mentioned by Mr. E. T. Cresson in his Monograph of N. A. Philanthidæ (Proc. Ent. Soc. Phila., vol. v, p. 88, 1865) belongs to *subfrigidus*.

Aphilanthops subfrigidus n. sp.

♀.—Length 11-16 mm. Black, with bright yellow markings. Head closely and finely punctured on vertex, face covered with a thin growth of hair, black except three broad stripes on face yellow (like *frigidus*, but more extended and usually all connected anteriorly, making whole of face except two narrow diverging lines below antennæ yellow), also a yellow line on posterior orbits; eyes farther apart than their greatest length; third joint of antennæ distinctly longer than distance from hind ocelli to eye margin, no smooth shining spot behind; clypeus 5-dentate, a few shallow punctures; mandibles piceous, yellow outwardly at base; antennæ subfiliform, scape yellow spotted, black, tip of last joint only ferruginous, third joint longer than 4-5 combined. Thorax black, a band, usually interrupted, on collar, spot on scutellum, post-scutellum, posterior angles (all liable to be absent), tegulæ and spot behind tubercles yellow, a fairly long growth of hair mostly below and posteriorly; mesothorax wrinkled, closely and finely punctured; scutellum closely and a little more finely punctured; metathorax finely and closely punctured, elevation not smooth shining, not divided by suture, a cavity above. Abdomen black, with deep yellow spots on first segment, a usually disconnected band on second, a sometimes disconnected band on third, bands on segments four and five, sixth usually yellow, or yellow and piceous, sometimes piceous alone, shaped like *frigidus*, subdepressed, a very few hairs at base: venter black, usually yellow marked, with quite a sweep of hairs. Legs as in *frigidus*, except yellow is more pronounced. Wings fulvous, nervures lighter than *frigidus*, no light spot before stigma.

♂.—Length 8-13 mm. Abdomen ovate, eyes about as far apart as their greatest length, clypeus 3-dentate, a yellow band on sixth segment, face (usually) covered with a thin growth of hair, otherwise as in ♀.

Twenty-one females, twenty-nine males. Washington, Nevada, Vancouver Island. The specimens from Vancouver (all males) show color almost white. This may be due to an immersion in spirits.

Aphilanthops foxi n. sp.

♂.—Length 13-14 mm. Mostly bright yellow, a few black markings. Head yellow, except irregular line across vertex and subquadrate patch back of this which are black, vertex closely and finely punctured; eyes as far apart as their greatest length; hind ocelli about the distance of two-thirds of third antennal joint from eye-margin, no smooth shining spot behind; mandibles yellow, red tipped; clypeus irregular, but not dentate, mustache dull red; scape yellow, flagelium filiform, first joint black and second partly so, next five or six joints rust colored, tip darker, third antennal joint longer than 4-5 combined. Thorax yellow, with three narrow lines on mesothorax, a band across posterior edge of the same, a wider band across front edge, metathorax connected by a narrow line with a subquadrate patch on posterior face (which contains a few yellow dots) and a wedge-shaped mark near middle coxæ, all black; covered with a thin

growth of short white hairs somewhat longer on posterior angles; mesothorax finely and sparsely punctured; scutellum and post-scutellum smooth shining, not punctured; metathorax, except elevation, which is smooth shining, roughly and closely punctured. Abdomen closely covered with medium-sized punctures; yellow, with a narrow, posterior, rufous-colored band on segments 1 to 4 or 5, rest yellow, except tip, which is rufous tinted; a very short growth of white hair above; venter mostly yellow, a longer growth of white hair. Legs yellow, except spot on under side of femora and tip of first and all of remaining tarsal joints, which are rufous. Wings not clouded, clear, stigma and nervures rust colored, stigma without light spot before.

Two specimens collected by Mr. D. W. Coquillett (and deposited by Mr. W. J. Fox in the collection Acad. Nat. Sci.), one from Southern California and the other from San Diego County same State. The collection of the U. S. National Museum contains two other examples of this species.

Dedicated to Mr. Wm. J. Fox.

Aphilanthops bakeri Dun.

Aphilanthops bakeri Dunning, Can. Ent. vol xxviii, p. 203 (1896).

♂.--Length 8.5 10 mm. Black with bright yellow markings. Head closely and finely punctured, covered with a fine white down, black except face and line behind eyes; eyes about as far apart as their greatest length; ocelli about distance of length of third antennal joint from eye-margin, no smooth shining spot behind; clypeus not dentate, but with three not very distinct lobes; mandibles yellow, rufous at tip; third joint of antennæ shorter than joints 4-5 combined, scape yellow spotted, flagellum rufous (more or less) on first half and tip, rest black, filiform. Thorax covered with a growth of fine white hair, black except collar, sometimes a spot below, tegulæ, tubercles, crescent-shaped spot back of tubercles, a V-shaped mark below and back of this, spots on scutellum and post-scutellum and posterior angles, yellow; mesothorax finely, but not as closely punctured as head, wrinkled; scutellum more sparsely punctured, smooth shining; metathorax finely punctured, elevation not shining or divided by suture. Abdomen closely and finely punctured, except first segment, which is coarse; a more sparse growth of fine down posteriorly; first segment spotted, 2-6 with bands narrowed in center, sometimes disconnected, all yellow, rest black; venter black and fairly hairy, liberally spotted with yellow; coxæ and trochanters yellow spotted; first four-fifths of femora outwardly black, rest yellow; tibia yellow, except dark spot inwardly and tip, which is inclined to rufous; tarsi inclined to rufous, except first joint, which is yellow. Wings inclined to dusky, nervures and stigma ferruginous with a light spot before stigma.

Two males, Colorado, collected by Prof. C. F. Baker.

Aphilanthops laticinctus Cr.

Philanthus laticinctus Cresson, Proc. Ent. Soc. Phila. v, 91 (1865).

Aphilanthops laticinctus Patton, l. c.

♂.—Length 5-9 mm. Black with lemon-yellow markings. Head black, except yellow anteriorly on clypeus and side pieces, covered with a dense growth of short silvery hair, closely and finely punctured; eyes above about as far apart as their greatest length or a little more; no smooth spot behind ocelli,

about as far from eye-margin as the length of third joint of antennæ; clypeus 3-dentate, mustache yellowish; mandibles yellow, rufous tipped; scape yellow, second antennal joint black, rest ferruginous, darker above, filiform, third joint as long as 4-5 combined. Thorax with a silvery growth of hair longer below; black, interrupted line on collar, spot below, scutellum anteriorly, post-scutellum, large spot on posterior angles, tegulæ, tubercles and spot back of same yellow; mesothorax with fine close punctures, wrinkled; scutellum shining, with medium sized punctures; metathorax with medium sized punctures, elevation not shining, indistinctly divided by suture, a small cavity above. Abdomen not hairy above, closely and mediumly punctured, black with lemon-yellow band on segments 1-5 (constricted medially on 1-2) located about the middle of the segment, a yellow dot sometimes on segment 6; venter with a few hairs, sometimes yellow marked. Legs black with last half or so of femora, tibia except rufous colored spot inside, yellow; tarsi inclined to rufous. Wings not clouded, sometimes tinged with fulvous, nervures light fuscous, stigma darker, a light spot before.

Hab.—Montana, Colorado, New Mexico (on *Bigelovia wrightii* by Prof. Cockerell in the Mesilla Valley, also at Santa Fé). Twenty-seven specimens.

Aphilanthops elsiæ n. sp.

♀.—Length 14 mm. Black with yellow markings. Head finely and closely punctured, except on face a rather long growth of ferruginous hair, black except face and line behind eyes, which are yellow (two black lines forming a disconnected band and surrounded by yellow on face, which is marked like *subfrigidus*); eyes farther apart than their greatest length; hind ocelli about two-thirds of the distance of the length of third antennal joint from eye-margin, no smooth shining spot behind; clypeus 5-dentate, edged with brown hairs; mandibles black, yellow outwardly at base, piceous at tip; scape yellow tipped, flagellum black, subfiliform, third antennal joint longer than 4-5 combined. Thorax black, collar, post-scutellum, scutellum, posterior angles, tegulæ, spot before, small spot on tubercles and larger spot behind, all yellow; a growth of ferruginous hair, longer below and posteriorly; mesothorax finely and closely punctured, wrinkled; scutellum finely and closely punctured, smooth shining, in center; metathorax more closely punctured, elevation not smooth shining, not divided by suture, a circular cavity above (like *subfrigidus*). Abdomen subdepressed; a few scattered hairs, mostly on first segment; finely and closely punctured, more deeply on first; black, large spots on first, barely interrupted bands on 2-4, band on 5, a mark on pygidium, yellow; pygidium margined, *frigidus*-like, but larger; claspers small, protruding beyond pygidium the distance of the length of penultimate tarsal joint; venter yellow marked, not hairy, smooth, with very few punctures. Legs yellow, except base of tibia; trochanters and coxæ black with yellow spots. Wings clear, stigma and nervures ferruginous, no light spot before stigma.

One specimen, California (deposited by W. J. Fox in Acad. Nat. Science).

Aphilanthops taurulus Ckll.

Aphilanthops taurulus Cockerell, Trans. Am. Ent. Soc. xxii, p. 293 (1895).

♀.—Length 11 mm. Black with pale yellow markings. Head strongly and closely punctured, covered with a short growth of silvery hair; black, except

prominent whitish band across anterior margin of clypeus and side pieces; eyes much farther apart above than their greatest length; ocelli with a smooth shining spot behind, a little less than the distance of the length of antennal joints 3–4 from eye-margin; scape of antennæ yellow tipped, third joint shorter than 4–5 combined; clypeus not dentate, evenly rounded; mandibles piceous. Thorax black, with collar, anterior portion scutellum, post-scutellum, tegulæ, tubercles and spot behind pale yellowish white, a whitish growth of fine hair below and posteriorly; mesothorax strongly and closely punctured, more finely so at edges; scutellum smooth, shining centrally, large punctures posteriorly; post-scutellum more finely punctured; metathorax rugose, smooth, shining, on elevation, which is divided by suture; suture strongly cross-wrinkled. Abdomen with large, sparse punctures; not hairy; black with yellow patches on segments 1-3 forming bands on 4–5, very wide on latter, segment 6 subquadrate as in *4-notatus*, a deep narrow emargination at sides, claspers as in *4-notatus*; venter smooth, shining, immaculate, a few hairs and punctures. Legs black, tibia yellow outwardly and strongly spined. Wings clear, stigma and nervures ferruginous, a light spot before stigma.

♂.—Length 9-11 mm. Two specimens show yellow on face confined to side pieces, while one specimen shows a band somewhat as in ♀, but shorter and narrower and confined to middle lobe. The latter also shows a spot on posterior angles of metathorax; mandibles yellow spotted outwardly (eyes farther apart than their greatest length); otherwise like ♀.

Hab.—New Mexico, Arizona. Two males, Las Cruces, New Mex., Ckll. 872, Ckll. 5090; one ♂ locality not specified; ♀ Arizona. On *Bigelovia wrightii* in the Mesilla Valley, New Mexico. Also at Rincon, New Mex. (Prof. Cockerell).

This species shows some little variation in the size and number of punctures.

Aphilanthops quadrinotatus Ashm.

Aphilanthops quadrinotatus Ashmead, Bull. No. 1 Col. Biological Asso. 1890, p. 7.

♀.—Length 8–10 mm. Black and rufous with pale yellow markings. Head black, covered with a short growth of silvery hair, vertex closely and finely punctured; greatest distance apart on vertex equal to four-fifths of length of eyes; ocelli the length of second and third antennal joints from eye-margin, no smooth spot behind; lower half of clypeus and side pieces yellowish, sometimes rufous, very slightly margined with black, not dentate; mandibles reddish yellow, black tipped; scape yellow, flagellum rufous, third antennal joint as long as two following. Thorax black, with an interrupted line on collar, anterior margin of scutellum, scapulæ, post-scutellum, oblong spot on lateral angles, tegulæ, tubercles and spot behind, all yellowish, with a short growth of silvery hair thicker below; mesothorax, scutellum and post-scutellum closely and finely punctured; metathorax more roughly punctured. Abdomen as long as head and thorax, finely and irregularly punctured; a few silver hairs above longer and thicker posteriorly; rufous, with a black band on margin of segments 3-4 and 4-5; segments 1-3 with oblong spots (last often forming an interrupted band), a band on 4 and 5, all pale yellow; sixth segment flattened, concave, subquadrate, ridged centrally, not marked; claspers obtuse and just protruding beyond segment 6, flattened; venter sometimes darkened apically, a few hairs and a few large punctures. Legs rufous, tarsi darkened. Wings hyaline, not clouded, stigma and nervures fuscous, the former darker and with a light spot before.

Thirty-six specimens, Montana. Ashmead's type was from Colo. Prof. Cockerell has taken this species on *Bigelovia wrightii* in the Mesilla Valley, New Mexico.

Aphilanthops concinnulus Ckll.

Aphilanthops concinnulus Ckll., Can. Ent. xxviii, p. 221. ♂ (not ♀), (1896).

♂.—Length 6-8 mm. Black and rufous (sometimes almost all black) with yellowish white markings. Head black, except most of middle lobe of clypeus and side pieces (all forming a band) which are yellowish white, finely but sparsely punctured, a growth of silvery hair very dense on face; eyes slightly farther apart than their greatest length; ocelli distance of length of third joint of antennæ from eye-margin, a barely noticeable smooth, shining spot behind; mandibles rufous, darker at tips, yellow without at base; third joint of antennæ long as 4-5 combined, scape yellow spotted, flagellum dark rufous, filiform. Thorax with a growth of short silvery hair, black (metathorax sometimes rufous), with collar, scutellums anteriorly and scapulæ, post-scutellum, lateral angles, tegulæ, tubercles and spot behind, all yellowish white; mesothorax with large rough punctures, mediumly close, not wrinkled; scutellum shining, smooth; metathorax inclined to rugose, elevation not shining, suture narrower than in *concinnulus*. Abdomen ovate, a few pale hairs, large punctures on segment 1, finer and closer on following, black or rufous, or both intermingled on segments 1-3, rest black; bands on segments 1-5 (emarginate posteriorly on first and divided on second, and sometimes on third) and a spot on segment 6, all yellowish white; venter with hairs, large punctures, banded with yellowish white, ground color same as above. Legs rufous, four posterior tarsi darker, knees and the tibia without yellowish white. Wings not clouded, nervures and stigma very dark, a light spot before latter.

Three specimens, Rincon, N. Mex. (on *Chilopsis saligna*). This may be a subspecies or race of *utahensis*.

Aphilanthops utahensis Baker.

Aphilanthops utahensis Baker, Can. Ent. xxvii, p. 335 (1895), ♂.

Aphilanthops concinnulus Ckll., Can. Ent. xxviii, p. 221 (1896), ♀ (not ♂).

♀.—Length 9 mm. Rufous, with yellow-white markings. Head rufous, with irregular dark band across region of ocelli, covered with a thin growth of silvery hair, finely and sparsely punctured; eyes as far apart as their greatest length; ocelli as far from eye-margin as length of third joint of antennæ, a not very distinct, smooth, shining spot behind; clypeus rounded, not dentate; mandibles rufous, black tipped, a yellow spot outwardly at base; antennæ rufous, darker above, filiform, third as long as 4-5 combined. Thorax rufous, with collar, scutellum anteriorly, scapulæ, post-scutellum, tegulæ, tubercles and spot behind, yellow; covered with a sparse growth of silvery hair mostly below and behind; mesothorax not distinctly wrinkled, with medium sized sparse punctures; scutellum smooth, shining, not punctured; post-scutellum edged with black; metathorax rugose rather than punctured, elevation not smooth shining, divided by suture, cavity above with crosswise wrinkles. Abdomen rufous, darker posteriorly, two spots on segment 1, an interrupted band on segments 2-3, a band, narrow on posterior edge, on segment 4, a spot on 5, all pale yellow, almost white; roughly punctured on first and more finely on rest, fairly close; a few scattered white hairs; apical segment as in *quadrinotatus*, but is twice emarginate

posteriorly, also a deep narrow notch on each side; venter immaculate, a few hairs and punctures. Legs rufous, fore knees, middle and hind knees and tibia outwardly yellowish white, middle and hind tarsi darker. Wings clear, nervures and stigma dark ferruginous, a light spot before stigma.

♂.—Length 7.5 mm. Black band on vertex interrupted on each side of ocelli; clypeus 3-dentate, two yellowish spots on corners of middle lobe and one on each of side pieces, covered with a dense growth of silvery hair; yellowish on fore legs a little more extended; a band on segments 1-5, disconnected on second only, apex darker than ♀, venter yellow banded; mesothorax with black and rufous merged, as are posterior lateral angles of metathorax; eyes a little farther apart than their greatest length; otherwise same as ♀, except that suture of metathorax shows no cross wrinkles.

One ♂ one ♀, former Utah (Mr. Baker's type), latter Rincon, New Mex. (type of *concinnulus* ♀).

I fail to find the yellow-white marks on clypeus in the ♀ as described by Prof. Cockerell. Possibly they have faded.

Not Identified.

Aphilanthops hispidus Fox.

Aphilanthops hispidus Fox, Proc. Cal. Acad. Sci. Vol. iv, p. 106 (1894).

♂.—Length 13 mm. Black; the head, thorax, femora and first segment of abdomen densely clothed with long whitish hair, as are likewise the ventral segments of abdomen, but not so densely; clypeus 3-dentate, finely punctured; hind ocelli separated from each other by a slightly less distance than they are from the eye margin; first joint of flagellum nearly as long as three following united, the second joint roundly and deeply emarginate beneath; thorax indistinctly sculptured, evidently very finely punctured or granulated on the meso- and metapleuræ; dorsal segments 6-7 distinctly punctured; mandibles, except apex, head below the antennæ, scape in front, posterior orbits narrowly, line on pronotum, tubercles, tegulæ, apex of four anterior femora, spot on hind femora above, all the tibia at base and on outer side, spot on each side of first abdominal segment (drawn out to a point within), fascia on apical part of segments 2-6 (that on second narrowly interrupted medially, on third very nearly interrupted, 4 5 emarginate on each side anteriorly, sixth indistinct) and spot on ventrals 2-3, all pale yellow or whitish; wings subhyaline, darker towards apex, nervures black, stigma testaceous.

San José del Cabo, Lower California, Mexico. October.

Since the above was prepared I have taken *A. laticinctus* and *A. quadrinotatus* at *Cleome serrulata* Denver, Colo., July 20th.

BURMEISTER'S TYPES OF ODONATA.

BY PHILIP P. CALVERT, PH. D.,

Instructor in Zoology, University of Pennsylvania, Philadelphia.*

(With Plate I.)

ORIGIN OF THE PRESENT PAPER.

In brief "Preliminary Notes on some African Odonata" published in volume xix, of these TRANSACTIONS, June, 1892, I made the remark, "The two species of *Orthetrum* here described as new may possibly be among the species already described by Burmeister or Rambur, but from their descriptions I could not satisfactorily identify them." And, in connection with the fuller descriptions of the same two *Orthetra*, contained in the Proceedings of the United States National Museum, volume xviii, the hope was expressed (p. 130) "that the present descriptions and figures will sufficiently characterize the species in question, so that those having access to types of previously described species may perceive the identity, if it exist."

If any one had perceived the identity, no published statement of the fact had appeared up to the Winter of 1895–'96, at which time I was studying in the University at Berlin. Dr. (and now Professor) Ferdinand Karsch, the well-known entomologist, of the Museum für Naturkunde in that city, then told me of the existence of some, at least, of Burmeister's types of Odonata in the Zoological Institute at Halle. Dr. Karsch had also experienced the difficulty of satisfactorily identifying African species of *Orthetrum* described by various authors. I was then planning to spend the Summer semester of 1896 at Jena, and when I suggested to Dr. Karsch that the short distance thence to Halle, might enable me to spend the Pfingsten, or Whitsuntide, week of holidays in an examination of such Burmeisterian *Orthetra* as might yet exist in the latter place, he was pleased to approve of the suggestion.

Accordingly, having first obtained the permission of the late Prof. Ernst Ludwig Taschenberg, then Professor of Entomology, I spent

* Researches made in the Zoologisches Institut of the Vereinigte Friedrichs-Universität Halle-Wittenberg, at Halle, Germany, and in the Museum of Comparative Zoology, Cambridge, Massachusetts.

the greater part of five days, May 26 to 30, 1896, in Halle, in studying the collection of Odonata there. The idea was then formed of listing and studying, as far as possible, all Burmeisterian types of Odonata, whether of *Orthetrum* or other genera. A brief statement of the results appeared in "Entomological News," volume viii, page 6, January, 1897.

But by no means all of Burmeister's Odonata exist in Halle. Correspondence developed the fact that other types, which had passed into the possession of the late Dr. H. A. Hagen, were to be found in the Museum of Comparative Zoology at Cambridge, Massachusetts. These were rendered accessible to study by the kindness of Mr. Samuel Henshaw, Curator for Insects, and a considerable part of a visit to Cambridge made between July 15 and August 4, 1897, was employed in examination of them.

The Aim of this Paper

is therefore to give as complete a list as possible of the present locations of Burmeister's types of Odonata, together with detailed descriptions of those species whose identity is more or less uncertain. These cases are mostly of the subfamily Libellulinæ, for in the other subfamilies most of Burmeister's species have been studied by Dr. Hagen or Baron de Selys-Longchamps, and their results recorded. Citations of these records are given in the following pages under the respective species.

Burmeister's Work on the Odonata, and the Sources of his Material.

Karl Hermann Conrad Burmeister, born in Stralsund, Jan. 15, 1807, died in Buenos Aires, May 2, 1892,* published but one work on the Odonata, and this is contained in pages 805-862 of the second

* The most extensive biographical notice is by Dr. Carlos Berg, in Spanish, in the Anales del Museo Nacional de Buenos Aires, vol. iv, pp. 315-357, 1895; it contains also a chronological list of his publications on all subjects. Dr. Berg gives a shorter "Notice Necrologique," in French, in Annales, Soc. Entom. France, lxiii, pp. 705-712, with a list of Burmeister's entomological works; both of these are accompanied by a portrait, and both are to a large extent based on Dr. O. Taschenberg's biography in Leopoldina xxix, pp. 43, 62, 78, 94. Halle, 1893. Shorter sketches are to be found in Entom. Monthly Magazine, London, xxviii, pp. 221-22, August, 1892, by R. McLachlan, and in Entomologische Nachrichten, Berlin, xviii, pp. 220-222, July, 1892 (anonymous). In the Anales Soc. Cientif. Argentina, xxxiii, pp. 145-150, is an account of the "Exequias funebres del Doctor German Burmeister," consisting chiefly of a "Discurso del Ministro de Instruccion Publica, Dr. Juan Balestra."

volume of his monumental "Handbuch der Entomologie," Berlin, 1839, T. C. F. Enslin. The systematic portion, which alone concerns us here, comprises 171 species, grouped under six genera, as follows: *Agrion* 32 species, *Calopteryx* 17, *Diastatomma* 10 (one not numbered), *Aeschna* 20, *Epophthalmia* 9, *Libellula* 83 (two not numbered). Of these the following numbers were described for the first time: *Agrion* 19, *Calopteryx* 8, *Diastatomma* 2, *Aeschna* 12, *Epophthalmia* 6, *Libellula* 48.

In the "Vorrede" to this second volume, page iv, in promising a continuation of the work, Burmeister says "auch wird, wie bisher, im Werke selbst jeder Geber namentlich bei jeder Art aufgeführt werden." "Wie bisher" applies especially to the Odonata, for the description of almost every extra-European species is followed by the name of the collection in which Burmeister found the types which he employed. This has added greatly to the ease of locating and identifying his types. The sources of his material, then, which he mentions are the collections of M. C. Sommer in Altona, W. v. Winthem in Hamburg, Prof. Germar in Halle, Graf v. Hoffmannsegg in Dresden, and of the University at Halle comprising species from Europe, from South Africa by Drège, and from Hindustan by King through the missionary Schmidt.

M. C. Sommer, described in Hagen's Bibliotheca Entomologica as "Banquier in Altona," was Burmeister's father-in-law (O. Taschenberg *l. c.* p. 44; Berg *l. c.* p. 317; Hagen, Psyche, v, p. 369, July, 1890). His death, "in der letzten Zeit," is barely mentioned in Stettiner Entom. Zeitung, xxix, p. 219, for April-June, 1868. I have not found any published notice of the fate of his Neuroptera, but some are in Cambridge, some in Vienna.

A "Nekrolog" of Wilhelm v. Winthem (1799-Sept. 2, 1847) is given by Dr. J. Steetz in Stet. Ent. Zeit. ix, pp. 194-198, July, 1848. Hagen, Biblioth. Entom. ii, p. 292, says of his collection "die Neuropteren besitzt H. Hagen."

Hagen, *l. c.* i, p. 273, says that Prof. Ernst Friedrich Germar's "Sammlung und Bibliothek sind in Prof. Schaums Besitz übergegangen." Hermann Rudolph Schaum was Germar's nephew and published a biography of his uncle in Stett. Ent. Zeit. 1853, pp. 375-390. Germar's Neuroptera, however, have become somewhat scattered, in Halle and in Cambridge.

Of Johann Centurius, Graf von Hoffmansegg (spelled with one or two "n"s) (Aug. 23, 1766-Dec. 13, 1849) Hagen states *l. c.* i. p. 374, "Seine Leben von H. Lichtenstein im Dresdener Album von Elfriede von Muehlenfels. Berlin. 1856. 8. p. 24-44. . . . . Seine Sammlung bildet den Schatz des Berliner Museums." On his collection see also Entom. News vii, p. 132, May, 1896. His Odonata which Burmeister employed seem to have remained in Halle, however.

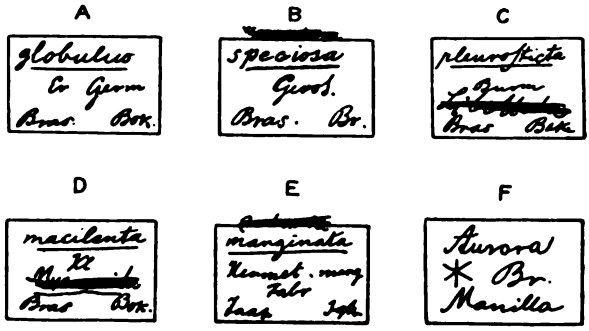
Of Drège I have found only one note. In Baron de Selys and Hagen's Monographie des Calopterygines, p. 231, under *Libellago caligata* is this: "Synon. Libellula nov. sp. No. 1520, Catalogue des insectes recueillis par C. Fr. Drège dans

l'Afrique meridionale (redigé par Erichson), Hamburg 1841." On p. 233, *l. c.* the name is spelled Drégé. Burmeister's types from this collection are in Halle, but other Odonata from Drège are in Berlin, Baron de Selys' collection at Liege, and at Cambridge. I know nothing further of King's or Schmidt's Odonata than that they are in Halle.

Present Locations of Burmeister's Types.

I. Zoologisches Institut, Halle.

The Odonata were found by me to be, for the most part without pin-labels, and standing below written labels pinned to the bottoms of the drawers containing the collection. These "drawer-labels" are colored, according to a scheme to show geographical distribution, as follows: white Europe, yellow Asia and adjoining islands, blue Africa, lilac or purple Australia, pink North America, green South America and Mexico. The hand-writing of these labels, Prof. Taschenberg told me, was Burmeister's own, and he further assured me that the collection had not been altered from the condition in



EXPLANATION OF FIGURES.

A–E, fac-similes of drawer-labels from the Zoological Institute, Halle, in Burmeister's handwriting. F, fac-simile of a label from a Winthem type in the Museum of Comparative Zoology, Cambridge.

which Burmeister left it. Each label has a single black-line border which measures 20 x 13 millimeters. Such labels are represented in the accompanying figures A–E, which have been produced by tracing some original labels and photographing these tracings, as experiment showed that the paleness of the ink and the color of the labels prevented the obtaining of good results by direct photography. For the labels in question I am also indebted to the late Prof. Taschenberg, who, in transmitting them, wrote, under date of 14. 9. 97, "erlaube ich mir Ihnen einige Etiquetten zu *schenken* an denen

Sie die Handschrift gut kennen lernen; dieselben stam̄en aus unserer Sam̄lung u. sind dadurch überflüssig geworden, weil B. die sie benennenden Unica bei seinem Scheiden von hier mit nach Cordova genom̄en hat. Ich will noch bemerken dass Burmeister nur mit Gänsekielen schrieb u. die Feder stets in der Tintenfasse stecken liess, infolge dessen sie im̄er sehr weich war."

Similar labels exist on some of Burmeister's types at Cambridge, *e. g.* that of *Agrion saucium*, and the reproductions here given are mainly for the purpose of aiding others in the recognition of types which I have not found, if such are still in existence.

A few labels of similar style and handwriting exist at Halle for species subsequently described by Charpentier, Rambur and Hagen.

The Burmeister species do not stand in the drawers in the order in which they are numbered in the Handbuch. All specimens, with the exception of a few with pin-labels of evidently much later date and other handwriting, were left by me in the same positions and under the same labels as I found them. Upon such specimens as, after study, I believed to be Burmeister's actual types, I placed the following written pin-label, "Considered by me as Burmeister's type of his . . . . [here the name of the species] . . . . P. P. Calvert, May, 1896." In the following pages such specimens are indicated by (T). The specimens as I found them, were for the most part in good condition.

The following species of Burmeister's Handbuch are now at Halle. The new species in the lists are marked with an asterisk.*

(*a*) From Sommer's collection.

Agrion 3. *amalia**
Calopteryx 5. *caja ?*
" 11. *chinensis*
Libellula 11. *lateralis**
" 36. *dimidiata*
Libellula 40. *domitia*
" 41. *pulla** [lows 56)
" *sabina* (no number, fol-
" 75. *semicitrea**

(*b*) From Germar's collection.

Agrion 27. *phallatum*
Aeschna 2. *4-guttata**
Libellula 6. *hæmatodes** ?
" 12. *longipennis**

* The following "Anmerk." is from page v, of vol. ii, of the Handbuch: "Der Stern (*) im Text hinter einer Familie, Gattung oder Art, bedeutet so viel als mihi oder nobis, und zeigt an, dass die Gruppe von mir unter diesem Namen zuerst aufgestellt worden ist." This explains the presence of the * on many of the written labels quoted later.

(*c*) From v. Winthem's collection (although not cited as such in the Handbuch).

Libellula 16. *pedemontana*
" 48. *umbrata*
" 49. *ruralis**
Libellula 50. *plebeja**
" 51. *discolor**

(*d*) From Drège's collection (small bits of unmarked blue paper as pin-labels).

Agrion 17. *glaucum**
" 18. *glabrum**
" 20. *caffrum**
" 24. *fasciatum**
" 25. *tessellatum**
" 26. *longicaudum**
" 29. *plagiatum**
Agrion 30. *virgatum**
Calopteryx 9. *iridipennis**
Libellula 8. *leucosticta**
" 13. *stictica**
" 14. *arteriosa**
" 52. *caffra**
" 74. *marginata*

(*e*) From Hoffmannsegg's collection.

Agrion 19. *pruinosum**?
Calopteryx 12. *luctuosa**
*Diastatomma decorata** (no number, follows No. 1)
Diastatomma 2. *parallelogramma**
Aeschna 14. *guttata**
" 16. *jaspidea** [lows 16)
*Libellula trivirgata** (no number, fol-
Libellula 22. *Tillarga*
" 23. *analis**
" 28. *Phyllis*
" 33. *fluctuans*
" 42. *equestris* (*feralis*)
" 59. *leptura**
" 62. *ferruginea*
" 63. *pruinosa**

(*f*) From King's collection.

Aeschna 15. *ephippigera**
Epophthalmia 1. *vittata**
Libellula 23. *analis**
" 27. *chinensis.*
" 29. *murcia*
Libellula 31. *indica*
" 42. *equestris*
" 60. *sanguinea**
" 67. *contaminata*

(*g*) From Zimmermann (not always mentioned in the Handbuch, but on the labels).

Agrion 8. *discolor**
" 10. *saucium**
Aeschna 2. *4-guttata**
Epophthalmia 2. *cinnamomea**
Libellula 78. *trimaculata*
" 80. *semifasciata**
" 81. *bifasciata*

(*h*) From Thorey, of Hamburg.

Calopteryx 6. *Brightwelli.*

(*i*) Collector not mentioned.

Agrion 2. *tullia**
" 9. *denticolle**
" 11. *tuberculatum*
" 12. *pumilio*
" 13. *hastulatum*
" 14. *interruptum*
" 15. *furcatum*
" 21. *minium*
Agrion 22. *chloridium*
" 23. *lacteum*
" 28. *cingulatum**
" 31. *barbarum*
" 32. *forcipula*
Calopteryx 14. *virgo*
" 15. *parthenias*
Diastatomma 5. *serpentina*

Diastatomma 6. *flavipes*
" 7. *forcipata*
" 9. *gigantea*
Aeschna 7. *grandis*
" 8. *chrysophthalma*
" 9. *juncea*
" 10. *mixta*
" 13. *azurea* (*imperator*)
Epophthalmia 4. *flavo-maculata*
" 5. *metallica*
" 6. *aenea*
Libellula 17. *vulgata*
" 18. *flaveola*
" 19. *albifrons**
" 20. *nigra*
" 21. *pectoralis*
" 54. *vesiculosa*
" 69. *caerulescens*
" 70. *cancellata*
" 71. *conspurcata*
" 72. *depressa*
" 79. *quadrimaculata*

Of the European species contained in this list it should be said that room for doubt exists as to their being in all cases types of the Handbuch. Some subsequent additions have undoubtedly been made to the collection at Halle and can be detected as such. It is quite possible that some others exist which cannot be so distinguished.

II. MUSEUM OF COMPARATIVE ZOOLOGY, CAMBRIDGE.

The greater part of the Burmeister types here are from Winthem's collection, acquired by Hagen previous to 1861. All such specimens have a printed pin-label "Winthem," and usually also a white, written pin-label, with a single black-line border measuring 20 x 14 millimeters. A fac-simile of such is given in figure F, page 30, reproduced in the same way as the others; the hand-writing is unknown to Mr. Henshaw or myself. There are also some types from Sommer's and Germar's collections, indicated by written pin-labels, often in Hagen's hand-writing. Hagen's own copy of the second volume of the Handbuch, in the Museum library, has the following written on the front fly-leaf, "Dr. H. Hagen. Koenigsberg 1840. Die unterstrichenen Arten sind in meinem Samlung, die * alt Typen." Although this refers to Hagen's practice of placing a line under the number of each species, as given by Burmeister, which he possessed, and a star in front of the numbers of those species of which he possessed Burmeister's types, yet in some cases, mentioned subsequently, although Hagen's copy has both * —, a careful search in the collection has failed to reveal any Burmeister specimens.

The list of types follows; as before, the * denotes new species described by Burmeister.

(*a*) From v. Winthem's collection.

Agrion 7. *fumipenne**
Calopteryx 1. *lineata**
" 2. *fenestrata**
" 7. *tricolor**
" 8. *apicalis**
Calopteryx 10. *auripennis**
" 13. *holosericea**
" 16. *dimidiata**
" 17. *maculata*
Epophthalmia 7. *lateralis**

Epophthalmia 9. *gracilis**
Libellula 1. *venosa**
" 2. *pulchella**
" 3. *pleurosticta**
" 4. *hemichlora**
" 7. *histrio**
" 8. *leucosticta**
" 9. *imbuta**
" 10. *fastigiata**
" 35. *obscura.*
" 38. *ochracea**
" 39. *castanea**
" 47. *tripartita**
Libellula 48. *umbrata*
" 53. *polysticta**
" 54. *vesiculosa* [lows 56)
" *sabina* (no number, fol-
" 57. *stemmalis**
" 58. *chrysostigma**
" 59. *leptura**
" 61. *semiaquea**
" 64. *testacea**
" 65. *aurora**
" 66. *sanguinolenta**
" 77. *auripennis**
" 78. *trimaculata*

(*b*) From Sommer's collection.

Agrion 5. *dorsale**
" 6. *croceum**
" 20. *caffrum**
Calopteryx 13. *holosericea**
Aeschna 4. *luteipennis**
" 11. *septentrionalis**
Epophthalmia 8. *albicincta**
Libellula 44. *connata**

(*c*) From Germar's collection.

Agrion 10. *saucium**
" 12. *pumilio*
" 16. *heterostictum**
" 28. *cingulatum**
Calopteryx 4. *americana*
Aeschna 18. *junia*
Epophthalmia 3. *eustalacta**
Libellula 16. *pedemontana*
" 19. *albifrons**
" 20. *nigra*
" 22. *Tillarga*
" 23. *analis**
" 69. *cærulescens*

III. K. K. Naturhistorisches Hofmuseum, Vienna.

When in Vienna, in March, 1896, the idea of studying *all* of Burmeister's types had not been formed, and I did not then know that any of his types were there. A few notes on some *Orthetra* were made, however, but the fact that two *O. sabina* Burm. (not Drury) were labeled "Coll. Somer 1870", but without any indication that they were types, was forgotten by me until about the time that the printing of this paper was commenced. An inquiry directed to Prof. Dr. Kraepelin, Director of the Natural History Museum at Hamburg, as to the existence there of the types not to be found at Halle and at Cambridge had suggested applying to Hofrat Brunner von Wattenwyl in Vienna. Hofrat Brunner, who purchased the Orthoptera and the Odonata of Sommer's collection, replied that he had given the latter to the Hofmuseum. Prof. Dr Brauer has promised to send a list of Burmeister's types contained in this collection, which list I hope to be able to reproduce in the closing pages of this paper.

Of the following species I have not studied the types, some of which are in Vienna, as above explained.

(*a*) From Sommer's collection.

Agrion 1. *lucretia*
" 4. *macrurum**
Diastatomma 1. *clavata*
" 4. *campanulata**
Aeschna 3. *costalis**
" 5. *reticulata**
" 6. *gracilis**
" 17. *dorsalis**
" 19. *amazili**
" 20. *papuensis**
Libellula 5. *tessellata**
" 15. *rufinervis**
" 24. *terminalis**
Libellula 25. *basalis**
" 26. *carolina*
" 34. *pullata**
" 37. *fasciata*
" 43. *unimaculata*
" 45. *fallax**
" 46. *subfasciata**
" 55. *hæmatogastra**
" 56. *frontalis**
" 68. *zonata**
" 73. *sexmaculata*
" 76. *luctuosa**

(*b*) Collection not mentioned.

Calopteryx 3. *Titia.*
Diastatomma 3. *tricolora*
" 8. *hamata*
Aeschna 1. *lunulata*
" 12. *vernalis*
Libellula 32. *fulvia*

(*c*) v. Winthem's collection.

Aeschna 17. *dorsalis** (see also above)

Previous Studies of Burmeister's Types.

General acknowledgments of aid received by subsequent students of Odonata from Burmeister himself, or those whose collections he used, are contained in

De Selys and Hagen: Revue des Odonates ou Libellules d'Europe, Liége, 1850, page 265, 266, from Burmeister.

The same: Monographie des Calopterygines, Liége, 1854, p. viii, Sommer at Altona, Schaum at Berlin, and Burmeister.

The same: Monographie des Gomphines, Bruxelles, Leipzig, Paris, 1858, p. viii. Schaum at Berlin, Burmeister at Halle, Sommer at Altona.

Hagen, H. A. Synopsis of the Neuroptera of North America, Washington, 1861, p. vi. "Species collected in South Carolina by Mr. Zimmermann, and furnished by the late Prof. Germar of Halle. . . . My own collection, containing the types of Winthem, described by Prof. Burmeister. . . . Some types, chiefly from Labrador, described by Mr. Burmeister, and contained in the collection of Mr. Sommer at Altona."*

* On the same page vi is the statement "Where an (!) has been added to the name of the author, I have seen the types which he described." It is necessary to be cautious in applying this information, however. On page 79 of the book, such a ! is added to Burmeister's name following "Agrion discolor," yet on page 80 it is said of the same species "unknown to me." The latter statement is probably correct.

Specific acknowledgments of having studied Burmeister's types are contained in various papers, and these are quoted, under the respective species, in the detailed list following.

Arrangement of the Following List.

The numbers and names of the species follow the Handbuch, the pages of which are quoted. In brackets [ ] is placed the present generic name and, if Burmeister's be a synonym, the accepted specific name. The locality and collection quoted from the Handbuch follow in this type, in which are also printed any further extracts deemed necessary. The present location of the type or types, if known, succeeds, with any remarks which they require. The abbreviations used are B = Burmeister, M. C. Z. = Museum of Comparative Zoology, Cambridge, (†) see page 31 regarding the labels at Halle.

The accomplishment of the present work has only been rendered possible by the kindly aid of the late Prof. E. L. Taschenberg and of Mr. Henshaw. I greatly regret the death of the former, in his eightieth year, on the nineteenth of January last. He, his wife and son did much to render my stay in Halle very agreeable, and I wish that he could have received these results. To the Kaiserliche Leopold-Carolus Deutsche Akademie der Naturforscher in Halle, I was also indebted for the loan of several necessary journals to an unknown stranger.

Detailed List of Types.

1. Gatt[ung] Agrion. P. 817.

1. **Agrion lucretia** Drury. P. 818. [*Mecistogaster.*]

Aus Brasilien, nicht vom Kap, wie Drury sagt. Ein Weibchen in Sommers Sammlung.

The star (*) opposite the name of this species in Hagen's copy of Burmeister is the only, but insufficient, evidence that a female in the M. C. Z. with the label "Lucretia Dry. (libellula) linearis Fab. Brasilia," in an unknown hand, may be the type. This female agrees with the description of *Mecistogaster lucretia* by de Selys in 1860 (Bull. Acad. Belg.—2—x, p. 24). In 1890, however, de Selys stated (Ann. Soc. Ent. Belg. xxxiv, p. cxix) that his *lucretia* of 1860 ought to take the name of *amalia* Burmeister. See under No. 3 *post.*

2. **Agrion tullia** B. P. 818. [*Mecistogaster.*]

♀. **Aus Westindien; in Sommers und der Hallenser Sammlung.**

Two females under the green drawer-label "Tullia* Ind. Ocid. Th." in Burmeister's hand, at Halle. One is without a pin-label (†). The other with a green printed pin-label "Rio d. Jan." agrees better with Burmeister's description of *lucretia* Drury, as the pterostigma is concolorous with the white wing-apices. *Tullia* is considered by Selys to be a synonym of *Mecistogaster linearis* Fab.

3. **Agrion amalia** B. P. 818. [*Mecistogaster.*]

Aus Brasilien. Mehrere Männchen in beiden Sammlungen; vielleicht das andere Geschlecht der vorigen Art.

One male (†) under the green drawer-label "Amalia* Bras. Smr." at Halle.

The star and dash (* —) in Hagen's copy of Burmeister is the only evidence for the typical character of a male in the M. C. Z. labeled "Agrion amalia Burm Bras" in an unknown hand. This male agrees with de Selys' description of *Mecistogaster lucretia* of 1860, but I am unable to say whether it is identical with the type at Halle or not. See under No. 1 *ante.*

4. **Agrion macrurum** B. P. 819. [*Leptagrion.*]

♂ et ♀. **Aus Brasilien. Sommers Sammlung.**

I have not found the type. Hagen's copy of Burmeister has this species marked with star and dash (* —), but there are no Burmeister specimens in the M. C Z. This species is referred to *Leptagrion* by de Selys (Bull. Acad. Belg. —2—xlii, p. 977, 1876), but he does not quote the type.

5. **Agrion dorsale** B. P. 819. [*Leptagrion.*]

♂ et ♀. **Aus Brasilien. Sommers Sammlung.**

One male in M. C. Z. with the label "A. dorsalis* Br. Brasilia coll. Sommer"; the words "coll. Sommer" are underlined, and were added by Hagen. This male agrees with de Selys' description (Bull. Acad. Belg.—2—xlii, p. 981, 1876) of *Leptagrion dorsale*, except that the labrum is black instead of "jaunatre."

6. **Agrion croceum** B. P. 819. [*Leptagrion.*]

Aus Surinam. Sommers Sammlung.

One male in M. C. Z. with the label "A. crocea* Br. coll. Somer. Surinam"; the words "coll. Somer." are in Hagen's hand. De Selys, in describing this species as *Leptagrion croceum*, says (Bull. Acad.

Belg.—2—xlii, p. 989, 1876) that his description is based on the "Type unique de Burmeister, actuellement coll. Hagen. Le Dr. Hagen ayant eu la bonté de me communiquer ce type precieux, qui est en très-mauvais état, j'ai pu le decrire avec soin et en prendre un dessin exact." De Selys was, fortunately, able to describe the wings, of which only the bases now remain, so that the condition of the type is still worse.

7. **Agrion fumipenne** B. P. 819. [*Argia.*]

Aus Kentucki. v. Winthem's Sammlung.

One female in M. C. Z. with the written label "fumipeñis Br.* Kentucki", the printed label "Winthem."

8. **Agrion discolor** B. P. 819. [*Amphiagrion saucium* B. and *Ischnura verticalis* Say.]

testaceum unicolor, vel dorso rubicundo vel dorso toto nigro-aeneo, thorace bivittato; alarum stigmate pallido. Long. 1" ♀.

Aus Süd-Karolina; 2 Exemplare in der Hallenser Sammlung, von Zimmermann gesendet.

Three females at Halle, no pin-labels, stand under the pink drawer-label "discolor* Carol. Zm." in Burmeister's hand. Of these three one (♀) is a teneral female of *A. saucium* Burm., recognizable by the very acute, upper, outer angle of the pterostigma, and corresponds to the "dorso rubicundo" of the description; the last four abdominal segments are wanting. A second (♀) is a 'black' female of *Ischnura verticalis* Say and corresponds to the "dorso toto nigro-aeneo, thorace bivittato." The third female is an orange female of *Anomalagrion hastatum* Say and cannot be a type, as Burmeister quotes but two, and as the colors of this one do not correspond with his description.

De Selys (Bull. Acad. Belg.—2—xli, p. 285, 1876) has placed *discolor* as a synonym of *Amphiagrion saucium* Burm. Kirby (Catal. Odon. p. 143, 1890) has reversed the position of these two names, making *saucium* the synonym, presumably on the ground that in Burmeister's work *discolor* is No. 8 and *saucium* No. 10. Since it is now shown that Burmeister confused two species under *discolor*, it is evident that De Selys, and not Kirby, is to be followed in this matter of nomenclature.

9. **Agrion denticolle** B. P. 819. [*Ischnura.*]

♀. Aus Mexico.

One female (♀) under the green drawer-label "denticolle* Mexico" in Burmeister's hand, at Halle. (Pl. I, fig. 13).

On comparing this type with the description of *Nehalennia? denticollis* by de Selys (Bull. Acad. Roy. Belg.—2—xli, p. 1244, 1876) the only differences from that description which I could find were that the only black on the epistoma is a narrow basal band, and that there is a *suggestion* of a ventral spine at the apex of the eighth abdominal segment. De Selys adds (l. c. p. 1245) "Le Dr. Hagen n'a pas vu la femelle type de Burmeister, mais l'identité lui semble probable, d'après la forme du prothorax."

I have pointed out the identity of *Ischnura exstriata* Calvert with *denticolle* in Ent. News ix, p. 72.

10. **Agrion saucium** B. P. 819. [*Amphiagrion.*]

♂. **Aus Süd-Karolina, von Zimmermann; in Germars und der Hallenser Sammlung.**

One male in the M. C. Z. with the pink pin-label "Coll. Germar saucium Br. * Carolina. Type Burm. 819. 10." The words "saucium Br. * Carolina" may be in Burmeister's hand, the others are in Hagen's. The tip of the abdomen of this male is in bad condition.

One male (♀) under the pink drawer-label "saucium * Carol. Zm." in Burmeister's hand, at Halle. This specimen has been repaired at some time and the abdomen is fastened by its apex to the thorax.

This species is the *Amphiagrion saucium* of de Selys (Bull. Acad. Roy. Belg.—2—xli, p. 285, 1876) who expressly adds "La description du male est faite sur le type de Burmeister que M. Hagen m'a transmis." Under No. 8, *ante*, it is shown that *discolor* Burm. is, in part, the female of *saucium*.

11. **Agrion tuberculatum** Charpentier. P. 819. [*Ischnura elegans.*]

Bei uns, hie und da an Teichen, aber selten.

One female under the white drawer-label tuberculatum Charp. in Burmeister's hand, at Halle.

12. **Agrion pumilio** Charpentier. P. 820. [*Ischnura.*]

In Ungarn, dem nördlichen Italien und südlichen Deutschland.—Ein Pärchen in Germars Sammlung.

One male and one female on the same pin in M. C. Z. with the label "coll. Germ. pumilio Charp. Type Burm. II. 820, 12." in Hagen's hand, except the words "pumilio Charp." Two females and one male under the white drawer-label pumilio Charp., in Burmeister's hand, at Halle.

13. **Agrion hastulatum** Charpentier. P. 820. [*Agrion.*]

Gemein in Schlesien, auch bei Halle. Völlig dieselbe Art erhielt die Hallenser Sammlung vom Vorgebirge der guten Hoffnung aus der Drègeschen Sammlung.

Three males, two females under the white drawer-label hastulatum Charp. in Burmeister's hand, at Halle.

14. **Agrion interruptum** Charpentier. P. 820. [*Agrion pulchellum* VL.]

In Deutschland, bei Berlin und Halle, doch viel seltener als die folgende Art.

One female under the white drawer-label interruptum Charp., in Burmeister's hand, at Halle.

15. **Agrion furcatum** Charpentier. P. 820. [*Agrion puella* L.]

Sehr gemein bei Halle und Berlin.

Three males, two females under the white drawer-label furcatum Charp., in Burmeister's hand, at Halle.

16. **Agrion heterostictum** B. P. 820. [*Ischnura.*]

pallidum, dorso nigro-æneo, mesonoto bivittato, abdominis segmento secundo chalybæo, ultimis 3 pallidis; stigmate alarum anticarum nigro, in apice albido, alarum posticarum toto albido. Long. 1″ 2‴.

Aus Neu-Holland, mehrere Männchen in Germar's Sammlung.

One male in M. C. Z. with the pin-label "Coll. Germar heterostictum Br. Type Burm. II, 820, 16. Nov. Holl."; the words 'Coll. Germar' and 'Type Burm. II, 820, 16.' are in Hagen's, the others in an unknown hand.

This species is the *Ischnura heterosticta* of de Selys (Bull. Acad. Roy. Belg.—2—xli, p. 271, 1876) who remarks "Burmeister donne pour patrie: Nouvelle Hollande, d'après plusieurs males de la collection Germar. Quoiqu'il dise que le 10e segment est également pâle et que le ptérostigma des inférieures est tout blanc, je ne puis guère douter de l'identité." This remark is quite just, for the above cited male agrees with de Selys' description throughout and has the 8th and 9th segments, not the 10th, "pallidis," and the pterostigma of the hind wings barely darker in the centre.

17. **Agrion glaucum** B. P. 821. [*Enallagma.*]

Vom Vorgebirge der guten Hoffnung, 2 Männchen aus der Drègeschen Sammlung.

Two males (♂), one with a bit of unmarked blue paper on its pin, under the blue drawer-label "glaucum * Pr. b. sp." in Burmeister's

hand, at Halle. These males agree with de Selys' description of his *Enallagma gabonense* (Bull. Acad. Roy. Belg.—2—xli, p. 533, 1876). This latter, as its name indicates, was described from the Gaboon, but I have a pair (♂ ♀) of this species from the Cape, sent to me by M. Martin. The female has not hitherto been described. Its markings are much like those of the male, but the blue and green of the latter are replaced by luteous (the individual is evidently teneral), the postocular spots are larger, dorsum of 8–10 black, appendages luteous, as long as 10, apical ventral spine of 8 well developed, all the tibiæ with an anterior (external) black line (this is also true for the male), pterostigma very pale luteous. Abdomen 26 mm., hind wing 18.5 mm.

Baron de Selys describes a "Disparonevra glauca Burm." (Bull. Acad. Roy. Belg.—2—x, p. 443, 1860) stating its locality thus "Cap de Bonne-Espérance, par Dregé.—Port natal. (Collect. Selys, Hagen)." It will be noticed, therefore, that he does not assert having seen Cape individuals, while in the M. C. Z. there is a female with a pin-label, in Hagen's hand, "A. glaucum M. B. Drege Catal. No. 1511," and this *is a Disparoneura*. Probably Drège confounded two species.

18. **Agrion glabrum** B. P. 821. [*Ceriagrion.*]

Long. ♂. 1″ 3‴. ♀ 1″ 4‴.

Vom Vorgebirge der guten Hoffnung, aus Drège's Sammlung.

One male (T), one female (T), each with a bit of unmarked blue paper on its pin, under the blue drawer-label "glabrum * Pr. b. sp." in Burmeister's hand at Halle. I compared them with de Selys' description of *Ceriagrion glabrum* (Bull. Acad. Roy. Belg.—2—xlii, p. 527, 1876) and found them to agree therewith. The length of the male is 36 mm., of the female 42 mm.

19. **Agrion pruinosum** B. P. 821. [?]

nigro-æneum, ore pectore abdominisque ventre testaceis; alarum stigmate luteo. Long. 1″ 3‴.

A. pruin. *de Haan, in litt.*

Aus Java, ein Männchen vom Herrn Graf v. Hoffmannsegg mitgetheilt.

I have not been able to identify Burmeister's type of this species. Baron de Selys describes a species of *Pseudagrion* under this name (Bull. Acad. Roy. Belg. (2), xlii, p. 517, 1876), but does not quote the type. A male with a printed label "Mus. Berol," and a written label "pruinosum Java Burm." in Hagen's hand, in the M. C. Z.,

agrees with De Selys' description, but cannot be Burmeister's type as the pectus is mostly black; Hagen's identification may, nevertheless, be correct, as De Selys states that in the younger individuals the pectus is paler. The last four segments of this male are lost.

Two males found by me standing under the yellow drawer-label "pruinosum d. Haan Java" in B.'s hand, at Halle, no pin-labels, are specifically different from each other and from de Selys' description of *Pseudagrion pruinosum*. Both agree with Burmeister's description. I could not identify them.

One agrees with *Pseudagrion* in venation, but has the inferior appendages distinctly longer than the superior appendages, although not as long as 10, and similar in profile view to those of *Enallagma cicile* for example. Superior appendages little more than half as long as the inferiors, in profile bifid at apex with a thicker, superior branch and a slender, straight, longer, inferior branch, approximately parallel, not divergent. Rhinarium, lips, and rear of head luteous. No apparent postocular spots. Vertex, prothorax and thoracic dorsum to second lateral suture blackish, little metallic reflection; sides behind second lateral suture and pectus yellow. Dorsum of 1-7 metallic-blue or green, of 10 black; 8 and 9 pale blue, 9 with a black band on either side of the dorsum only in the apical half, uniting at apex with fellow of opposite side. Ventral surface of 1-10 yellowish. Pterostigma luteous, darker in the middle, surmounting slightly less than one cell; 14 postnodals. Abd. 31. Hind wing 23.

The other male has the last four abdominal segments wanting; a Platycnemine (legion) wing has been wrongly added, the other three are genuine. It belongs to the legion Agrion, has the inferior sector of the triangle rising far in front of the submedian cross-vein, which is placed between first and second antenodals. Wings petiolated not quite as far as level of first antenodal. Upper side of quadrilateral one-fourth as long as the lower side on the front wings, slightly less than one-half as long as the lower side on the hind wings; 11 postnodals. Pterostigma luteous, surmounting one cell. Vertex and rear of head black, no postocular spots. Rhinarium, lips yellow. Thoracic dorsum dark metallic purple to first lateral suture. Sides and pectus yellow, a complete black line on second lateral suture. Dorsum of 1-6 dark metallic blue, with an interrupted, narrow, basal, yellow ring on 3-6. Inferior abdominal surface obscure yellowish. Total length of head, thorax and first six abdominal segments 24 mm., hind wing 18 mm.

20. **Agrion caffrum** B. P. 821. [*Pseudagrion.*]

nigro-æneum, ore fronte infra pectore abdominisque ventre rubropallidis; alarum stigmate fusco; mesonoti vitta laterali pallida. Long. 1″ 4‴.

Vom Port natal und St. Johanna, einer der Comorischen Inseln, 2 Männchen, das eine aus der Drègeschen Sammlung, das andere von Hrn. Sommer.

Three males stand under the blue drawer-label "caffrum * Afr. austr." in B.'s hand, at Halle; two with bits of unmarked blue paper on their pins, the other without any pin-label. The three are all

specifically different as shown by the shapes of their appendages. Only one can be a type, as it alone has "fronte infra . . . . rubropallidis" and "mesonoti vitta laterali pallida"; the other two are a *Pseudagrion prætextatum* Selys (= *P. Deckeni* Gerstaecker, Karsch, Berl. Ent. Zeit. xxxviii, p. 38, 1893) and a *Pseudagrion* species which I could not identify.

In the M. C. Z. is a male with the label "A caffrum Burm. type * coll. Somer" in Hagen's hand; it agrees with the description of the presumed type at Halle which follows:

♂ (type). Vertex blackish with metallic green reflection in parts; an indistinct postocular spot and occiput reddish (?); frons and the first two joints of antennæ pale reddish brown, clypeus and labium luteous, labrum yellow-orange, rear of head yellowish.

Prothorax blackish, a yellowish spot above the first legs; hind margin entire, rounded.

Thoracic dorsum black with some green and blue metallic reflections; a narrow, pale blue, antehumeral stripe; sides perhaps pale blue in life, markings obscured in drying, but apparently there was a black line on the upper half of the (obliterated) first lateral suture and a complete black line on the second lateral suture. Pectus pale yellowish.

Legs (3 wanting) luteous, femora superiorly, tibiæ anteriorly black.

Abdomen: dorsum of 1-8 and of 10 black with blue metallic reflections. Articulation between 8 and 9 and dorsum of 9 pale blue; sides of 9 black, connected on the dorsum with that of the opposite side by a transverse, apical, black band whose width is equal to one-fifth of the length of the segment. Apical margin of 10 concave to a depth of not quite one-half the length of the segment. Ventral surface of 1-10 yellow.

Appendages clogged with some yellow substance which renders accurate description difficult. Superiors slightly longer than 10, directed slightly downward; viewed from above, slightly curved throughout their entire length, the convexity outward, tip of inferior branch directed inward as a fine black point. Viewed in profile, the superior margin is slightly convex; apical half bifid, inferior branch directed downward at an angle of 45° with the superior, which is continued in the prolongation of the basal half of the appendage; the inferior branch reaches hardly farther backward than does the superior branch (compare this description, however, with Pl. I, figs. 2 and 3, from the much better preserved type in the M. C. Z.).

Inferior appendages about half as long as the superiors, apparently slender and directed upward and backward.

Wings: pterostigma reddish brown with a narrow yellowish line immediately within the bounding black veins, outer side slightly more oblique than the inner, surmounting one cell; three antenodal cells.

Front wings with upper side of quadrilateral slightly less than half as long as the lower side: 15 R, 16 L postnodals; nodal sector arising slightly in front of the seventh postnodal.

Hind wings with upper side of quadrilateral slightly more than half as long as lower side; 15 R, 14 L postnodals; nodal sector arising slightly in front of the sixth postnodal.

Total length 43.5. Abdomen 35. Front wing 27. Hind wing 26.

In Hagen's own copy of de Selys' "Synopsis des Agrionines grand genre Agrion," 1876, now in the library of the M. C. Z., opposite the name *Pseudagrion angolense* is the note, in Hagen's hand, "= caffrum Br." On comparing the M. C. Z. type of *caffrum* with the description of *angolense* I think that the appendages, as well as some other parts, do not agree.

21. **Agrion minium** Harris. P. 821. [*Pyrrhosoma.*]
In Deutschland, aber selten.

Two males, three females under the white drawer-label "minium Charp. Berol." in B.'s hand, at Halle; no pin-labels other than one ♂ and one ♀ sex-mark.

22. **Agrion chloridium** Charp. P. 821. [*Erythromma najas* Hansm.]
In Deutschland, nicht selten.

One male, one female under the white drawer-label "chloridium v. Ch." in B.'s hand, at Halle; no pin-labels.

23. **Agrion lacteum** Charp. P. 822. [*Platycnemis pennipes* Pallas.]
In Deutschland nicht selten, bei Halle sehr gemein.

Two males, two females under the white drawer-label "lacteum Charp. Halæ" in B.'s hand, at Halle; no pin-labels.

24. **Agrion fasciatum** B. P. 822. [*Chlorolestes.*]
Vom Port natal, 2 Männchen aus Drège's Sammlung.

Two males (T) under the blue drawer-label "fasciatum * Pr. b. sp. Drg." in B.'s hand, at Halle; one with a bit of unmarked blue paper on its pin, the other without any pin-label. Both agree with de Selys' description of *Chlorolestes fasciata* (Bull. Acad. Roy. Belg. —2—xvi, p. 36, 1862), except that these types have 17 and 21 post-cubitals on the front wings instead of 14–16. In de Selys' description the words "dedans" and "dehors" referring to the feet should be transposed.

25. **Agrion tessellatum** B. P. 822. [*Chlorolestes.*]
Eben daher; gleichfalls 2 Männchen.

Two males (T) under the blue drawer-label "tessellatum * Pr. b. sp. Drg." in B.'s hand, at Halle; one with a bit of unmarked blue paper on its pin, the other without any pin-label. Both agree with de Selys' description (*l. c.* p. 35) of *Chlorolestes tessellata.*

26. **Agrion longicaudum** B. P. 823. [*Chlorolestes longicauda et conspicua.*]

supra nigro-æneum, subtus pallidum; mesonoto vittis duabus dorsalibus et lateralibus aurantiaco-flavis; segmentis abdominalibus in basi fascia interrupta angusta pallida.

♂. alis aqueis, stigmate elongato castaneo. Long. 1¾″.

♀. alis luteis, stigmate dimidio nigro, dimidio castaneo. Long. 1″ 7¼‴.

Ebendaher und ebenda; das Männchen ist durch seinen äusserst schlanken Hinterleib sehr ausgezeichnet.

One male (T) with pin-label '385', and one female (T) with a bit of unmarked blue paper under the blue drawer-label "longicaudum * Pr. b. sp. Drg." in B.'s hand, at Halle. The male measures 60 mm. long and its pterostigma 3 mm.; it agrees with de Selys' description (*l. c.* p. 34) of *Chlorolestes conspicua*. The female is 50 mm. long., its pterostigma 2.25 mm., and agrees with de Selys' description (*l. c.* p. 35) of *Chlorolestes longicauda*.

27. **Agrion phallatum** Charp. P. 823. [*Sympycna fusca* VL.]

Hie und da in Deutschland und Ungarn.

One male, one female under the white drawer-label "phallatum Charp. Germ." in B.'s hand, at Halle; no pin-labels.

28. **Agrion cingulatum** B. P. 823. [*Lestes.*]

Aus Neu-Holland, beide Geschlechter in der Hallenser Sammlung.

One male (T), one female (T) under the lilac drawer-label "cingulatum Holl. nov." in B.'s hand, at Halle; no pin-labels. They agree with de Selys' description (Bull. Acad. Roy. Belg.—2—xiii, p. 334, 1862) of *Lestes cingulata*, but in his description of the abdomen 'dessus' and 'dessous' should be transposed. As his description was made from imperfect individuals, the following notes were made from the types to supply the deficiencies.

♂ (type). Pale blue basal spot on the second abdominal segment rounded posteriorly and, on the mid-dorsal line, reaching to a little more than one-third the length of the segment. Basal annuli on 3 8 (on 8 very narrow) also pale blue.

Superior appendages (Pl. I, fig. 1) as long as 8, and longer than 9 or 10. Viewed from above, they are curved inward at two-fifths their length, the apical three-fifths being approximately straight; the two consequently come in contact at their apices; external margin for rather more than the middle third denticulated; a strong, oblong, basal tooth, directed downward (ventralward), backward and inward, with its apex truncated almost at right angles to its sides; in the middle third a second, very acute, slightly longer, infero-internal tooth, directed backward, only partially visible when the appendage is viewed from directly above; terminal third dilated cylindrically on the inner side before the apex, which is obtuse, rounded and somewhat hairy.

Inferior appendages about one-eighth as long as the superiors, slender, in close contact with each other, and extending backward about as far as does the basal tooth of the superiors.

♀ (type). Basal annuli on 3-7 pale reddish. The pale reddish spot at the base of 2 reaches, on the mid-dorsal line, to one-half the length of the segment.

Abdomen ♂ 31, ♀ 30. Hind wing ♂ 22, ♀ 24.

In the M. C. Z. is a male, whose last four abdominal segments are wanting, with a lilac pin-label "*Coll. Germar* cingulatum Br. *Type Burm. II. 823. 28* Nov. Holl." in which the words here printed in italics are in Hagen's handwriting. While this male is of the same species, I see no reason to regard it as a type, and the same remark applies to a specimen, with the last seven segments lacking, which I saw in de Selys' collection in August, 1896, and which had a label written by Hagen "Agr. cingulatum Burm. type Nouv. Holl.," and a printed label "Mus. Berol."

29. **Agrion plagiatum** B. P. 824. [*Lestes.*]

♂. et ♀. **Vom Port natal, aus Drège's Sammlung.**

One male (T), one female (T) under the blue drawer-label "plagiatum Pr. b. sp." in B.'s hand, at Halle; no pin-labels. Both agree with de Selys' description (*l. c.* p. 324) of *Lestes plagiata* and, in spite of the difference in locality noted on the label, may be safely regarded as the types from B.'s remark under No. 30. The apex of the abdomen of the male is represented in Pl. I, fig. 4.

30. **Agrion virgatum** B. P. 824. [*Lestes.*]

♂. ♀. **Eben daher.—Beide Arten in der Hallenser Sammlung.**

Two males (T), one female (T) under the blue drawer-label "virgatum Pr. b. sp. Drg." in B.'s hand, at Halle; no pin-labels, other than a bit of unmarked blue paper on the pin of one male. These agree with de Selys' description (*l. c.* p. 323) of *Lestes virgata*, except that they are larger: Abdomen ♂ 41, ♀ 39; hind wing ♂ 27.5, ♀ 29 mm. The apex of the abdomen of the male is represented in Pl. I, fig. 9.

31. **Agrion barbarum** Van der Linden. P. 824. [*Lestes.*]

Gemein an Teichen.

One male, one female under the white drawer-label "barbarum V. Lind. Charp." in B.'s hand, at Halle; no pin-labels.

32. **Agrion forcipula** Charp. P. 824. [*Lestes sponsa* Hansm.]

Ebenda, und nicht minder häufig.

Two males, one female under the white drawer-label "forcipula Charp." in B.'s hand, at Halle; no pin-labels.

2. Gatt[ung] Calopteryx.

1. **Calopteryx lineata** B. P. 826. [*Micromerus.*]
Aus Java, in v. Winthem's Sammlung.

One male with the printed pin-label "Winthem", and the written pin-label "* Java lineata Br.," in the M. C. Z. It agrees with the description in de Selys' Monog. Calopt., p. 237, of *Micromerus lineatus*, young male.

2. **Calopteryx fenestrata** (Wiedem.) B. P. 826. [*Rhinocypha.*]
Eben daher, ein Männchen in v. Winthem's Sammlung.

One male with the written pin-label "Java * Agr. fenestrata", in the M. C. Z. It agrees with the description of *Rhinocypha fenestrata* in Selys' Monog. Cal., where, on p. 219, is the following note: "M. Rambur a cru que la *fenestrata* de M. Burmeister se rapportait plutôt à la *perforata*. C'est une erreur prouvée par l'examen du type de la collection Winthem".

3. **Calopteryx titia** Drury. P. 826. [*Hetærina.*]
Von der Honduras-Bay.

Burmeister does not state that he has seen this species, and I have not found any type of his in any collection.

4. **Calopteryx americana** Fabr. P. 826. [*Hetærina.*]
Aus Amerika. Zwei von Fabricius beschriebene Exemplare in der vormals Hübnerschen, jetzt Germarschen Sammlung; beide haben jedoch weder Kopf noch Hinterleib.

Two males in the M. C. Z. have each this label "Agr. americana * type Fabr. * Burm. coll. Hybner, later coll. Germar" in Hagen's hand. One of these two has also "coll. Huebner. Germ. americana Fabr. typ. Typ. Burm." of which the words "americana Fabr. typ." are in a larger hand, the others in Hagen's. Both of these males lack the head and abdomen (except the first segment). They are referred to by Baron de Selys (Monog. Calopt. p. 133) "Comme il [Fabricius] a décrit cette espèce [*americana*] d'après des types de la collection Hybner, qui ont été communiqués obligeamment à M. Hagen par M. Germar, il ne peut pas y avoir de doute sur son identité."

It may be noted that at Halle, under the pink drawer-label "americana Carol. Zm."† in Burmeister's hand, I found three females, without pin-labels, of *Calopteryx maculata* Beauvois, although one of them may be Burmeister's *C. dimidiata* (see No. 16).

† *I. e.* americana Carolina Zimmermann.

5. **Calopteryx Caja** [*nec*] Drury. P. 826. [*Hetærina auripennis et hebe.*]
Aus Brasilien, 2 Männchen in Sommer's Sammlung.

One male under the green drawer-label "Caja Drur. Bras. Bokl" in B.'s hand, at Halle; it has three pin-labels—a white ♂ sex-mark, a green printed label "Rio. d. Jan.", and a white label "Hetærina" in Hagen's hand. I could not compare it with the Monographie des Calopterygines. There is no label on any specimen in the M. C. Z. showing it to have been B.'s type. The synonymy given above is according to Monog. Calopt. p. 106, although nothing is there said of having studied B.'s types. See also note under No. 10 *post.*

6. **Calopteryx Brightwelli** Kirby. P. 827. [*Hetærina.*]
Aus Brasilien, ein Männchen in der Hallenser Sammlung, von Herrn Thorey in Hamburg mitgetheilt.

One male under the green drawer-label "Brightwelli Kirb. Bras. Thor." in B.'s hand, at Halle; no pin-labels.

7. **Calopteryx tricolor** B. P. 827. [*Hetærina.*]
Aus Pennsylvanien.

One male in the M. C. Z. with the printed label "Winthem", the written labels "Philadelphia" and "C. tricolor * Burm. II. 827. 7", the latter in Hagen's hand. It agrees in part with the description of *Hetærina tricolor* in Selys' Monog. Calopt., p. 136, but the specimen has apparently been broken and repaired for the last seven abdominal segments do not agree with the description and figure of the Monographie, but belong apparently to *H. carnifex* Hagen. De Selys says (*l. c.*) of the description of *tricolor:* "Décrite d'apres le mâle type, de Philadelphie (collection Winthem), et un couple du Musée de Vienne, reçus de l'Amérique septentrionale.".

8. **Calopteryx apicalis** B. P. 827. [*Calopteryx.*]
♂. ♀. **Vaterland unbekannt; in v. Winthem's Sammlung.**

In the M. C. Z. are the following specimens with pin-labels: one male "Winthem" (printed), "apicalis * Burm. Philadelphia" (written), "* Burm. II. p. 827.8" (written in Hagen's hand); one male "Winthem" (printed), "* Burm. II. p. 827.8. Philadelphia, Pa." (written in Hagen's hand); one female "Winthem" (printed), "* Burm. II. p. 827.8. Philadelphia, Pa." (written).

In his most recent publication on this species (Psyche, v, p. 246. Dec., 1889), Hagen states that his material consisted, among others, of "Burmeister's types from Philadelphia, Pa., two males, one female without pterostigma;" they are also cited in the Monographie des Calopterygines, p. 24 (1854).

9. **Calopteryx iridipennis** B. P. 827. [*Phaon.*]

♂ **Vom Port natal, aus Drège's Sammlung;**

One male (T) under the blue drawer label "iridipennis * Pr. b. sp. Drg." in B.'s hand at Halle; no pin-labels other than a bit of unmarked blue paper.

Hagen's copy of B.'s work has the * — for this species, but there is no Burmeister specimen in the M. C. Z.

10. **Calopteryx auripennis** B. P. 827. [*Hetærina.*]

♀ **Vaterland unbekannt, in v. Winthem's Sammlung.**

A female in the M. C. Z. with the pin-labels "Winthem" (printed) and "Agrio auripeñis * Brasil?" (written) is probably the type; it agrees with the description of *Hetærina auripennis* in de Selys' Monog. Calopt. p. 109.

I found no drawer-label for this species at Halle, but a female with a green pin-label in Hagen's (?) hand "C. auripennis Br. ♀ Cajæ". See No. 5 above.

11. **Calopteryx chinensis** Fabr. P. 828. [*Neurobasis.*]

♂. ♀. **Aus China, woselbst häufig.**

One male under the yellow drawer-label "chinensis A. ch. Fabr. China Smr." in B.'s hand, at Halle; no pin-labels.

Hagen's copy of B.'s work has * —, but there is no Burmeister specimen in the M. C. Z.

12. **Calopteryx luctuosa** (de Haan) B. P. 828. [*Vestalis.*]

Agr. malachiticum de Haan. in litt.

Aus Java, beide Geschlechter in der Hallenser Sammlung.

One male (T), one female (T) under the yellow drawer-label "luctuosa d. H. ♀ malachitica d. H. Java v. Hoffm." in B.'s hand, at Halle; the ♂ with a pink pin-label '25', the last four abdominal segments wanting; the ♀ with the pink pin-label '26'.

13. **Calopteryx holosericea** B. P. 828. [*Calopteryx maculata* Beauv.]

Aus Java; beide Geschlechter in Sommer's und v. Winthem's Sammlung.

The following specimens are in the M. C. Z. One male with two written pin-labels (1) "A. fumipennis Br." in B.'s hand, but without border, and on the reverse side "C. holosericea Burm. 828. * No. 13 coll. Somer" in Hagen's hand, and (2) "C. holosericea * Burm. II. 828. 13. coll. Sommer. Java (error)" in Hagen's hand. Next follows a female with the pin-label "Java (error!) Aus Leiden 1864", not a

type, see below. One male with the pin-labels "Winthem" (printed), "holosericea Br. Philadelphia" (written). One male with the pin-labels "Winthem" (printed), "C. holosericea * Burm. * Sel. Hag." in Hagen's hand. One female with the pin-labels "Winthem" (printed), "C. holosericea ♀ * Burm. * Selys Cal. p. 29" in Hagen's hand. One male "Winthem" (printed), "Pensylvan" (written), "C. maculata * Burm." in Hagen's hand; this male has clear spots in the dark portions of the wing.

Pinned to the bottom of the drawer below the above specimens is the following note in Hagen's hand: "The 5 specimens (the ♀ from Leyden excepted) are Burm. types. The male labeled Java was presented to me by Mr. Sommer, and in the collect. label. C. fumipennis Br., which name was changed in the Hdb., as he has done several times. Perhaps Sommer's specimen came from the Leyden Mus., what would explain the error. The types Winthem has Philadelphia on the label, not mentioned by Burm."

De Selys (Monog. Calopt. p. 29) has also a note on *Calopteryx maculata* (with *holosericea* Burm. as a synonym) beginning "Nous avons examiné un grande nombre d'individus entre autres les types de Rambur et de Burmeister."

14. **Calopteryx virgo** L. P. 828. [*Calopteryx.*]
Hie und da in Deutschland, und dann gemein.

Two males, two females under the white drawer-label "virgo Lin. ♂ & ♀ German." in B.'s hand, at Halle; one male and one female each with a white sex-label, the latter also with a white pin-label which I could not interpret.

15. **Calopteryx parthenias** Charp. P. 828. [*Calopteryx splendens* Harr.]
In den meisten Gegenden Deutschlands,

Three males, three females under the white drawer-label "parthenias Charp. Halæ" in B.'s hand, at Halle; no pin-labels.

16. **Calopteryx dimidiata** B. P. 829. [*Calopteryx.*]
Aus Nord-Amerika, ein Weibchen in der Hallenser Sammlung.

No drawer-label for this species at Halle (see note under No. 4).

One female in the M. C. Z. with the pin-labels "Winthem" (printed), "dimidiata Burm. * Kentucki" and "* Burm. II. p. 826. 16." Hagen's copy of B. has no * opposite this name, but in Psyche, v, p. 246, 1889, he quotes Burmeister's type.

17. **Calopteryx maculata** Beauv. P. 829. [*Calopteryx.*]

Aus Nord-Amerika.

No drawer-label for this species at Halle. See the note on No. 13 above.

3. Gatt[ung] Diastatomma Charp. P. 831.

1. **Diastatomma clavata** Fabr. P. 832. [*Ictinus.*]

Aus China; beide Geschlechter in Sommer's Sammlung.

I have not seen the types. Hagen's copy of B. has * — for this species, but no B. specimen is in the M. C. Z. De Selys in describing this species as *Ictinus clavatus* says (Monog. Gomph. p. 287) "Les exemplaires que nous avons eus sous les eux sont le mâle type de Burmeister, (collection Sommer)," etc.

Diastatomma decorata M. [us.] B. [erolinensis] no number or description. B. P. 832. [*Ictinus.*]

Das Hallenser Museum erhielt diese Art im männlichen Geschlechte durch Herrn Grafen von Hoffmannsegg.

One male under the yellow drawer-label "decorata M. B. Java Hoffm." in B.'s hand, at Halle; no pin labels.

This species was first described by de Selys in 1854 (Bull. Acad. Belg. xxi—2—p. 29) as *Ictinus decoratus* and, in the Monog. Gomph. p. 275, he states "Nous avons eu sous les yeux le type de Hoffmannsegg, cité par Burmeister au Musée de Berlin;"

2. **Diastatomma parallelogramma** B. P. 832. [*Macrogomphus.*]

Aus Java unter dem Namen Corduleg. parall. vom Herrn Grafen v. Hoffmannsegg.

One female (♀) under the yellow drawer-label "parallelogramma M. B. Java Hoffm." in B.'s hand, at Halle; no pin label.

Hagen's copy of B. has *, but no — before this name; a male in the M. C. Z. has a label in Hagen's hand including a "* Burm." De Selys, in the description of *Macrogomphus parallelogramma*, says (Monog. Gomph. p. 91, 1857) "Java, d'après la femelle type du Musée de Halle, communiquée obligeamment par le professeur Burmeister à M. Hagen, qui en a fait la description que je viens de transcrire."

3. **Diastatomma tricolora** Beauv. P. 833. [*Diastatomma.*]

Afrika, in der Nähe von Benin; ein Männchen dessen Raife winkelförmig gebogen sind und mit einen Knopfchen enden.

I have not found any B. specimens, and it is possible that B. did not see this species.

4. **Diastatomma campanulata** B. P. 833. [*Zonophora.*]
Aus Brasilien, in Sommer's Sammlung; ein Männchen,

I have not found the type. Hagen's copy of B. has * — for this name, but there is no B. specimen in the M. C. Z. De Selys, in the description of *Zonophora campanulata*, says (Monog. Gomph. p. 236, 1857) "Le Bresil, d'après le mâle type de la collection Sommer, décrit par M. Burmeister."

5. **Diastatomma serpentina** Charp. P. 833. [*Ophiogomphus.*]
Im mittleren und südlichen Deutschland, ziemlich häufig; beide Geschlechter wurden auch bei Halle öfters gefangen.

One male, two females, under the white drawer-label "serpentina Charp. Halæ" in B.'s hand, at Halle; no pin-labels.

6. **Diastatomma flavipes** Charp. P. 833. [*Gomphus.*]
In Schlesien, auch bei Halle.

One male, one female, under the white drawer-label "flavipes Charp. Halæ" in B.'s hand, at Halle; no pin-labels.

7. **Diastatomma forcipata** Charp. P. 834. [*Gomphus vulgatissimus* L.]
Ueberall gemein, zumal im mittleren Deutschland.

Two males, two females, under the white drawer-label "forcipata aut. Lipsiæ" in B.'s hand, at Halle; no pin-labels.

8. **Diastatomma hamata** Charp. P. 834. [*Onychogomphus forcipatus* L.]
In Deutschland und Schweden, aber selten.

The white drawer-label "hamata Charp. Halæ" in B.'s hand exists at Halle, but there are no specimens.

9. **Diastatomma gigantea** Leach. P. 835. [*Petalura.*]
Aus Neu-Holland, das Männchen von Leach abgebildet, das Weibchen in der Hallenser Sammlung.

One female under the lilac drawer-label "gigantea ♀ Petal. g. Leach Holl. nova." in B.'s hand at Halle; no pin-label. Hagen's copy of B. has the * —, but there is no B. specimen in the M. C. Z.

4. Gatt[ung] Aeschna Fabr. P. 835.

1. **Aeschna lunulata** Charp. P. 836. [*Cordulegaster annulatus* Latr.]
Ueberall in Europa hie und da, aber nirgends häufig.

I have not found any B. specimens.

2. **Aeschna 4-guttata** B. P. 837. [*Boyeria vinosa* Say.]
♀. **Aus Pennsylvanien, in Sommer's und Germar's Sammlung.**

One female (♀) under the pink drawer-label "4-guttata Burm. Am. bor. Zm." in B.'s hand, at Halle; no pin-label. Hagen's copy of

B. has * —, but the only specimen labeled "Pennsylvanien" is a male and the specific label, in Hagen's hand, says nothing of its being a type.

3. **Aeschna costalis** B. P. 837. [*Neuræschna.*]

♀. **Von Bahia, in Sommer's Sammlung.**

I have not found the type. Hagen's copy of B. has * —, but there is no B. specimen in the M. C. Z. In Verhandlungen k. k. zoolog.-botanischen Gesellschaft in Wien, 1867, p. 54, Hagen says of the species of *Neuræschna*, "Ich kenne davon nur eine und besitze davon nur ein unvollständiges Weibchen *Ae. costalis* Burm. Ich habe 1849 von dem typischen Weibchen in Sommer's Sammlung, und von dem zur selben Art gehörenden typischen Männchen im Berliner Museum von *Gynacantha ferox* Erichson, Schomburgk's Reise in Guyana T. 3 p. 585 folgende Beschreibung entworfen."

4. **Aeschna luteipennis** B. P. 837. [*Aeschna.*]

♂. **Aus Brasilien, in Sommer's Sammlung.**

One male, in the M. C. Z., with the pin-label "coll. Somer A. luteipennis Burm. * Brasil" in Hagen's hand. Hagen says (Verhdl. z-b. Gesell. Wien 1867, p. 50) of *Aeschna excisa* Brauer, "Diese Art ist *Ae. luteipennis* Burm. Ich besitze eine der beiden Typen Burmeister's aus Sommer's Sammlung."

5. **Aeschna reticulata** B. P. 837. [*Staurophlebia.*]

♂. **Aus Surinam, in Sommer's Sammlung.**

The green drawer-label "reticulata Burm. Bras. Boke" in B.'s hand exists at Halle, but there is no specimen. Hagen's copy of B. has * —, but there is no B. specimen in the M. C. Z. Hagen says (Verhdl. z.-b. Gesell. Wien 1867, p. 53) of *Staurophlebia magnifica* Brauer, "Ich halte diese Art für *Aeschna reticulata* Burm. von der ich die Type aus Surinam in Sommer's Sammlung verglichen habe."

6. **Aeschna gracilis** B. P. 837. [*Gynacantha.*]

Von Bahia, beide Geschlechter in Sommer's Sammlung.

I have not found the types. Hagen's copy of B. has * —, but there is no Burmeister specimen in the M. C. Z.

7. **Aeschna grandis** L. P. 838. [*Aeschna.*]

Gemein in nördlichen und mittleren Europa.

Two females under the white drawer-label "grandis Char. rufescens V. L." in B.'s hand, at Halle; no pin-labels.

8. **Aeschna chrysophthalma** Charp. P. 838. [*Aeschna rufescens* V L. = *isosceles* Müll.]

Im mittleren und südlichen Europa; seltener als die vorige, Art, fliegt auch später.

Two males under the white drawer-label "rufescens V. Lind. chrysoph. Charp. Austr." in B.'s hand, at Halle; no pin-labels.

9. **Aeschna juncea** L. P. 838. [*Aeschna cyanea* Müll.]

In ganz Europa, und nirgends selten.

One male, one female, under the white drawer-label "juncea aut. maculatiss. Charp. Styria" in B.'s hand, at Halle; no pin-labels; both are *Ae. cyanea* Müller.

10. **Aeschna mixta** Latr. P. 839. [*Aeschna coluberculus* Harr.]

In Deutschland, hie und da.

Two males, one female, under the white drawer-label "mixta V. L." in B.'s hand, at Halle; no pin-labels.

11. **Aeschna septentrionalis** B. P. 839. [*Aeschna.*]

corpore gracili fusco, viridi-cœruleo variegato; alarum stigmatibus elongatis nigris, membranula accessoria tota nigra. Long. 2" 1'".

Uterque sexus alis cinerascentibus, cercisque breviusculis obtusis pilosis.

Aus Labrador, in Sommer's Sammlung.

One female in the M. C. Z. with the pin-label, "A. septentrionalis Burm. type coll. Somer" in Hagen's hand, has lost the last three abdominal segments, the pterostigma is *pale brown*, the membranule *still paler brown*. Hagen has not noticed these differences in the most detailed description of this species which exists (Psyche, v, p. 354, June, 1890).

12. **Aeschna vernalis** Vander Linden. P. 839. [*Brachytron pratense* Müll.]

In Deutschland, Belgien, und Italien.

I have not found either B.'s label or specimens.

13. **Aeschna azurea** Charp. P. 840. [*Anax imperator* Leach.]

In Ungarn und Italien.

Some specimens stand below the drawer-label "imperator Leach formosus V. Lind." in B.'s hand, at Halle; no pin-labels.

14. **Aeschna guttata** M[us]. B[erol]. B. P. 840. [*Anax.*]

Aus Java; beide Geschlechter in der Hallenser Sammlung, unter obigem Namen vom Herrn Grafen v. Hoffmannsegg eingegangen.

One male (♂), one female (♀), under a yellow drawer-label, unlike the others and with no border, "A. guttata Mus. Berol. Java d.

Hffmsgg." in Hagen's hand, while "magnus Rb." in another hand is inserted after "Mus. Berol.", at Halle; the male with no pin-label, the female with a pink pin-label "10". I believe them to be the types. The female has "cerci in nostro specimine desunt." Hagen says (Verhdl. z.-b. Gesell. Wien 1867, p. 39 *et seq.*) of *guttatus* Burm. "Die Typen in der Hallenser Sammlung aus Java von Hoffmansegg habe ich 1861 verglichen, mir aber nichts darüber bemerkt. Dagegen habe ich in Sommer's Sammlung in Altona 1849 ein Männchen aus Java von Burmeister als *A. guttatus* bezettelt genau untersucht, mit Rambur's Beschreibung verglichen und mir darüber folgendes vermerkt:
. . . . . Dies Männchen ist ohne Zweifel A. magnus Rambur
. . . . . Ausser den erwähnten Stücken habe ich im Berliner Museum ein Weibchen aus Java gesehen, von Hoffmansegg als *A. guttatus* eingesandt, also zweifellos mit Burmeister's Type identisch. Etwas näheres über dasselbe habe ich nicht vermerkt, es muss also in keiner Weise von der damals kurz zuvor verglichenen Type Sommer's und Rambur's Beschreibung abgewichen haben."

15. **Aeschna ephippigera** B. P. 840. [*Hemianax.*]

♂. **Von Madras; ein schönes Exemplar in der Hallenser Sammlung aus der Sendung des Herrn King an den vormaligen Missionär Hrn. Schmidt.**

One male (T) under the yellow drawer-label "ephippigera Burm. mediterr. Sel. senegal. Rb. Madr. Kg." in Prof. E. L. Taschenberg's hand, at Halle; no pin-label.

Hagen says (Verhdl. *l. c.* p. 31) "Nach Vergleich der Type im Museum in Halle ist *Aeschna ephippigera* Burm, identisch mit *Anax mediterraneus* Selys und *Anax senegalensis* Rambur, von welchen Arten mir gleichfalls Typen vorliegen."

16. **Aeschna jaspidea** M[us]. B[erol]. B. P. 840. [*Anaciæschna.*]

♀. **Aus Java, unter obigem Namen vom Herrn Grafen v. Hoffmannsegg.**

Two females (T) under the yellow drawer-label, without border, "A. jaspidea M B. c. var. Java d. Hoffmgg." in Hagen's hand, at Halle; with pink pin-labels, one "11", the other "13".

Hagen says (Verhdl. *l. c.* p. 33) of *jaspideus* Burm "Meine Beschreibung ist 1849 nach einem Stücke des Berliner Museums, vom Grafen v. Hoffmansegg mitgetheilt, gefertigt. Selbes ist zweifellos identisch mit Burmeister's gleichfalls von Hoffmansegg mitgetheilter Type im Museum zu Halle, die ich 1861 verglichen habe."

17. **Aeschna dorsalis** B. P. 840. [*Anax.*]

♀. **Vom Vorgebirge der guten Hoffnung, in Sommer's und v. Winthem's Sammlung.**

I have not found the type.

Hagen says (Verhdl. *l. c.* p. 37) of this species: "Die Beschreibung ist nach Burmeister's Type einem Weibchen in Sommer's Sammlung entworfen. In Winthem's Sammlung fehlte sie, obwohl sie Burmeister auch hier angibt. Wahrscheinlich ist letztere Angabe eine Irrthum, wenigstens passt Burmeister's Angabe appendicibus truncatis auf Sommer's Type, bei welcher die Spitze eines Appendix deutlich abgebrochen ist."

18. **Aeschna junia** Drury. P. 841. [*Anax*]

♂. **Aus Nordamerika; in Germar's Sammlung.**

One male in the M. C. Z. with the green pin-label "collect Germar junia B. Typus Burm. II. 841. 18. Kentucky", of which the words "collect. Germar Typus Burm. II. 841. 18." are in Hagen's hand. Hagen says (Verhdl. *l. c.* p. 33), "Ich habe die Typen von *A. Junia* Burm. und *A. spiniferus* Rbr. verglichen; sie sind sicher identisch; auch ihre Identität mit Drury's und Say's Art dürfte zweifellos sein."

19. **Aeschna amazili** B. P. 841. [*Anax.*]

Aus Südamerika, beide Geschlechter in Sommer's Sammlung.

I have not found the types. Hagen's copy of B. has * —, but there is no Burmeister specimen in the M. C. Z.

Hagen gives a description of this species (Verhdl. *l. c.* p. 38) stating that "Die nachfolgende Beschreibung ist nach den Typen in Sommer's Sammlung 1849 gefertigt. Beide Geschlechter sind von Beschke bei Rio gefangen."

20. **Aeschna papuensis** B. P. 841. [*Hemianax.*]

♂. **Neu-Holland, in Sommer's Sammlung.**

I have not found the type.

Hagen says (Verhdl. *l. c.* p. 33) "Nach Vergleich der Type kann ich die Identität dieser Art mit *A. congener* Rambur versichern."

5. Gatt[ung] Epophthalmia Burmeister, p. 844.

1. **Epophthalmia vittata** B. P. 845. [*Epophthalmia.*]

♂. **Von Madras; aus der Sendung des Herrn King an den vormaligen Missionär Herrn Schmidt erhielt das Hallenser Museum diese höchst ausgezeichnete Art.**

One *female* (♀) under the yellow drawer-label "vittata Burm. Madras Kg." in B.'s hand, at Halle; no pin-label. The difference

in sex, as stated in my notes, did not attract my attention until I was preparing this manuscript for the printer. I do not know whether the error is B.'s or mine. Hagen, indeed, says: (Verhdl. *l. c.* p. 59) "E. vittata Burm. Ich habe die Type ein Männchen aus Madras genau beschrieben" etc.

2. **Epophthalmia cinnamomea** B. P. 845. [*Didymops transversa* Say.]
♀. **Aus Carolina; von Zimmermann.**

One female (♀) under the pink drawer-label "cinnamomea Burm. Carol. Zm." in B.'s hand, at Halle; no pin-label.

3. **Epophthalmia eustalacta** B. P. 845. [*Synthemis.*]
♂. **Aus Neu-Holland, in Germar's Sammlung.**

In the M. C. Z., one male with a dark lavender pin-label "Collect. Germar eustalacta B. Typus Burm II 845. 3 Nov. Holl.", the words 'Collect. Germar' 'Typus Burm II 845.3' in Hagen's hand, and a pink pin-label "Synth. eustalacta B. ♂" in de Selys' hand.

In his 'Synopsis des Cordulines', de Selys gives the dimensions of *Synthemis eustalacta* Burm. ♂ as abdomen 29 mm., aile inférieure 32 (Bull. Acad. Belg.—2—xxxi, p. 562); in the first Additions thereto he states "N. B. Dans le Synopsis il y a interversion de dimensions pour le male. Il faut lire: Abdomen 32 mm. et aile inférieure 29." (l. c. xxxvii, p. 31). Having measured the type male I find the abdomen to be 38 mm., hind wing 32.

4. **Epophthalmia flavo-maculata** Vander Linden. P. 846. [*Somatochlora.*]
Beide Geschlechter bei Halle und Berlin.

One male, one female, under the white drawer label "flavomaculata Charp. Lib. fl. Halæ Bhle." in B.'s hand, at Halle; no pin-labels.

5. **Epophthalmia metallica** Vander Linden. P. 846. [*Somatochlora.*]
Auch bei Halle, wie an mehreren Stellen Deutschlands.

One female under the white drawer-label "metallica Charp. Berol." in B.'s hand, at Halle; no pin-label.

6. **Epophthalmia ænea** L. P. 846. [*Cordulia.*]
Gemein in ganz Europa.

One male, one female, under the white drawer-label "ænea * Lib. ænea Fabr. Cord. Curt. 616 Halæ" in B.'s hand, at Halle; no pin-labels.

7. **Epophthalmia lateralis** B. P. 847. [*Tetragoneuria cynosura* Say.]
corpore fusco-æneo, albide piloso; fronte ore femoribus anticis maculisque abdominalibus fulvis. Long. 1¼".
♂. cercis elongatis clavatis, extus curvatis. ♀. non vidi.
Von Philadelphia; in v. Winthem's Sammlung.

In the M. C. Z., one male with the written pin-label "Chlorosoma lateralis Burm. * Philadelphia", and the printed label "Winthem". Hagen refers to "the type of *C. lateralis* Burm., now in my collection," in Proc. Bost. Soc. Nat. Hist. xv, p. 270.

The type has a small rounded spot on the superior surface of the frons (continuous with the black stripe in front of the vertex) lying in the median groove. no teeth on the superior appendages, front wings unspotted. Hind wings with brown markings: a basal streak in costal and subcostal spaces to the first antenodal and in the median and submedian spaces not quite half as far, small streaks on the second antenodal and the submedian cross-vein, a spot on the middle of the (2-celled) anal triangle, confluent with a small streak on two adjoining extratriangular veins.

8. **Epophthalmia albicincta** B. P. 847. [*Somatochlora.*]
♀. Aus Labrador; in Sommer's Sammlung.

In the M. C. Z., a female with the pin-labels "coll. Somer", "Labrad"; a male with the pin-labels "coll. Somer", "C. albicincta * Burm." — all four labels are in Hagen's hand. As B. specifies only the female, it alone can be the type, although Hagen speaks of "the types of *Cordulia albicincta* Burm." in Proc. Bost. Soc. Nat. Hist. xv, p. 376.

9. **Epophthalmia gracilis** B. P. 847. [*Oxygastra.*]
♂. Vaterland unbekannt, ein Exemplar in v. Winthem's Sammlung.

In the M. C. Z., one male with the written pin-label "Chlorosoma gracilis Burm.", the printed label "Winthem", and a dark manilla-paper pin-label "Oxygastra gracilis B. ♂" in de Selys' hand.

In his description of *O. gracilis* Burm., de Selys says (Bull. Acad. Belg.—2—xxxi, p. 308) "Décrite d'après le mâle type de la collection Winthem (coll. Hagen)."

The habitat of this species is still unknown. Karsch has discussed its relationship in Ent. Nach. xvii, p. 29, 1891, but I did not have this reference when studying the type.

6. Gatt[ung]. Libellula, p. 847.

1. **Libellula venosa** B. P. 848. [*Dasythemis.*]
fusca, fronte ore pectore femoribusque in basi pallidis; abdomine pruinoso; venis alarum omnibus infuscatis, stigmatibus elongatis fuscis. Long. 1".
Von Bahia; in v. Winthem's Sammlung.

One female in the M. C. Z. with the written pin-label "L. venosa

Burm. * Bahia", and the printed pin-label "Winthem". A description follows:

♀ type. Face and lips luteous, frons and vertex darker and with a slight metallic-blue reflection. Vertex low, its upper margin, viewed from in front, equally 3-sided. Eyes in contact for a distance equal to the length of the dark brown occiput. Rear of head dark brown with some paler spots. Prothorax dark brown, front lobe with a yellow spot on the middle of its anterior margin, hind lobe narrower than the other lobes, nearly semicircular in shape, its hind margin entire. Thorax and abdomen blackish, pruinose, some yellowish spots at the bases of the legs. Legs blackish (third pair missing), femora inferiorly luteous. Tenth abdominal segment produced backward ventrally so as to be three times as long as dorsally, and thus underlying the "anal tubercle." Sternum of 9 also produced backward, underlying 10 in part and terminating in a rounded free margin bearing a transverse row of long bristles (Pl. I, fig. 7). Abdominal appendages one-half as long as 9, two and a half times as long as dorsal surface of 10, straight, simple, black. Vulvar lamina produced slightly beyond 8, its apex bilobed, lobes short, separated by an interval greater than the width of one of them, tips rounded. Ventral surface of 9 with two slender appendages.

Wings with most of the veins (which are themselves blackish) bordered on either side with yellowish brown, more especially at the apices and near the costal margins. Pterostigma dark reddish brown surmounting 2+-3+ cells. Membranule absent on the front wings, extremely small, grey, on the hind wings. Arculus slightly beyond the second antenodal, its sectors stalked, nodal sector not waved, supplementary sector next below the subnodal separated from it by but one row of cells, no hypertrigonals, all discoidal triangles free, one submedian cross-vein.

Front wings: 10 antenodals, the last one continuous, 9 postnodals, submedian cross-vein slightly farther than is the level of the first antenodal, internal triangle free, anterior side of discoidal triangle slightly broken so that the outer limb is one-fourth as long as the inner (proximal); one row of posttriangular cells to the level of the origin of the subnodal sector, then two rows nearly to the wing-margin, increasing to 3 marginal cells; superior sector of the triangle arising on the outer side thereof a little farther forward than its posterior angle.

Hind wings: 8 (left) 9 (right) antenodals, 9 (right) 8 (left) postnodals, submedian cross-vein nearer the base than is the first antenodal, discoidal triangle unbroken, sectors of triangle widely separated at their origins, two (right) or one (left) posttriangular cells between short sector and first sector of the triangle, increasing to 9 marginal cells.

Total length 33 mm., abdomen 23, front wing 27, hind wing 26, pterostigma 3.

Venosa is to be referred to the genus *Daxythemis* Karsch, from the generic description of which (Ent. Nach. xv, pp. 249, 251, 1889) it differs slightly as follows: The outer limb (äusserer Schenkel) of the broken anterior side of the triangle of the front wings is apparently relatively shorter as compared with the inner limb, the posttriangular cells (Diskoidalfelde) are regular, the triangle of the hind wings is normal, three-sided, instead of "durch Abstumpfung des äussern Winkels ebenfalls vierseitig", the hind lobe

of the prothorax of *Dasythemis* is said to be moderately large, heart shaped.

That these differences are not important—unless it be that as regards the prothorax—is shown by the fact that a male in the Mus. Comp. Zool., with the printed label "Mus. Berol." and the written label "liriope Bresil" in Hagen's handwriting, agreeing in all other particulars with *Dasythemis liriopa* Karsch (*l. c.* p. 252) shows the same differences from the generic description of *Dasythemis* as does the above described *venosa* ♀. This ♂ *liriope* is the species quoted by Hagen, without description, as *Dythemis liriope* Hagen in Syn. Neur. N. Amer. p. 317, 1861, and Proc. Bost. Soc. Nat. Hist. xviii, p. 87, 1875. It seems to have preserved its colors better than the individuals described by Dr. Karsch. A description of thorax and abdomen is therefore added.

Dasythemis liriopa Karsch ♂. Thoracic dorsum dark reddish brown, a narrow antehumeral stripe, not reaching upward more than half way to the wing-base, and a sinuous humeral line, greenish yellow. The reddish brown following this humeral line reaches half way to the spiracle and is followed by an oblique, yellowish band whose posterior edge almost reaches the spiracle, metepisternum brown, metepimeron and pectus pale obscure greenish. Wing bases and interalar pieces pruinose. Abdominal segments 1 and 2 pruinose above, yellowish beneath; 3-8 red above, with the articulations and the apex on either side black; 9 and 10 black. Superior appendages black, as long as 9, curved downward in the basal half, slightly upward in the apical half, in the third fourth with an inferior row of 4 denticles, apex acute. Inferior appendage black, about one-fifth shorter, apex blunt, ending in the usual two upturned denticles.

Another ♂ in the M. C. Z., marked "Rio Janeiro", is also of this species; the genitalia of the second abdominal segment are more easily examined in this individual. Except when the penis is protruded, as is the case with the preceding ♂, the genitalia cannot be called "stark vorragend". The hamule is slightly more prominent, is bifid, the inner branch the more slender; anterior lamina inconspicuous, entire; genital lobe widened and rounded at the tip.

Abdomen 22-23 mm., hind wing 25-26, pterostigma 2.75-3.

D. liriopa? ♀. A female in the M. C. Z. from Winthem's collection and marked "Bahia" may be the other sex of *liriopa*. It seems to be not fully colored, the markings of head and thorax being as described for the ♂ but paler throughout; the metallic blue of the frons being barely suggested. Abdominal segments 1-3 luteous, 3 with a dark brown spot each side at apex; 4-8 with a wide, dark brown stripe each side from base to apex, leaving a narrow, middle stripe and a spot each side luteous; 9 and 10 dark brown; 10 prolonged backward so as to be four times longer ventrally than dorsally; sternum of 9 likewise produced backward, terminating in a free rounded margin provided with a transverse row of bristles. Vulvar lamina not produced nor bilobed. A pair of slender, ventral palp-like organs on 9. Appendages of 10 similar to those of *venosa*. Wings smoky yellowish throughout, more intense at the bases and along the anterior margins, pale brownish just below the nodus, and somewhat darker

brown for the entire width of the wing, beginning at the level of the last antenodal and extending to the apex, centres of many of the cells clearer. Pterostigma ochre brown, surmounting two cells and parts of two others.

Front wings: 11 antenodals, 8 postnodals; posttriangular cells two, one, then two rows to beyond the level of the nodus and 4–5 marginal cells. Hind wings: 8-9 antenodals, 8 postnodals, extreme outer angle of the triangle very obliquely truncated. One row of posttriangular cells increasing between short sector and first sector of the triangle. Other neurational details as given for *venosa*.

Abdomen 24, hind wing 27.5, pterostigma 3.

Differing from *venosa* chiefly in the coloration of the wing.

The peculiar structure of the 9th and 10th segments in this female and in that of *venosa* is doubtless a character of generic importance.

2. **Libellula pulchella** B. P. 849. [*Celithemis ornata* Ramb.]

Von Savannah; in v. Winthem's Sammlung.

In the M. C. Z. one female with the written pin-labels "L. pulchella Burm. * Savannah", and "L. amanda Hag. L. pulchella Burm. *," the latter in Hagen's hand, and the printed pin-label "Winthem".

Writing of *Celithemis amanda* Hagen says (Psyche v, p. 384, 1890) "I have in my Synopsis (1861, p. 183) described this species after the type (♀) of Burmeister from Georgia (his *Libellula pulchella*, a name used long before)." Following a suggestion of Hagen's I have included this species in *Celithemis ornata* Rambur (Trans. Am. Ent. Soc. xx, p. 261, 1893).

3. **Libellula pleurosticta** B. P. 849. [*Macrothemis.*]

Aus Brasilien; in v. Winthem's Sammlung.

In the M. C. Z. one male with the written pin-label "pleurosticta Br. * Brasilia", and the printed pin-label "Winthem".

Describing *Macrothemis pleurosticta* Hagen says "Mir liegt nur ein Männchen aus Brasilien vor, Burmeister's Type aus Winthems, jetzt in meiner Sammlung" (Stet. Ent. Zeit. xxix, p. 286, 1868).

A detailed description of this type and of that of *hemichlora* is given in a paper on *Macrothemis*, in the current volume of the Proceedings of the Boston Society of Natural History, xxviii, pp. 324, 330.

4. **Libellula hemichlora** B. P. 849. [*Macrothemis.*]

Aus Brasilien; in v. Winthem's Sammlung.

In the M. C. Z. one female with the written pin-label "hemichlora Burm. * Bahia" and the printed pin-label "Winthem". A second female has the written pin-label "Bahia" and the printed pin-label

"Winthem"; it may or may not have been seen by B. See also the note under No. 3.

5. **Libellula tessellata** B. P. 849. [*Macrothemis?*]

Aus Brasilien; in Sommer's Sammlung.

I have not seen the type, which (a single individual) is in the Hofmuseum at Vienna, according to Prof. Brauer.†

Specimens identified, although not labeled, by Dr. Hagen as of this species are in the M. C. Z., and they are described in the paper mentioned under No. 3, page 321.

6. **Libellula hæmatodes** B. P. 849. [*Sympetrum.*]

obscure-sanguinea, thorace subtus testaceo; alarum venis sanguineis, stigmatibus et posticarum basi fulvis. Long. 1⅝".

Aus Neu-Holland, ein Männchen in Germar's Sammlung; unmittelbar an der Hypotenuse liegen drei Zellen.

Belongs to the group Mit zwei Zellenreihen hinter dem Dreieck der Vorderflügel, das Dreieck klein, ohne Querader, die Flügelzellen gross.

One male below the purple drawer-label "hæmatodes Burm. Holl. nov." in B.'s hand, at Halle; no pin-labels. I would have had no doubt that this was the type, were it not that the triangle of the front wings has one cross vein. Can B. have made a mistake and wrongly placed *hæmatodes* in this group?

A description follows:

♂ type? Vertex, frons, clypeus, labrum and occiput bright red. Vertex bifid at tip. Eyes in contact for a distance less than the antero-posterior dimension of occiput. Labium and rear of head luteous.

Prothorax luteous. Hind lobe red, as wide as any other prothoracic lobe, distinctly bilobed.

Dorsum of thorax red, sides and pectus luteous: upper ends of humeral and second lateral sutures with a narrow black line each.

Feet reddish-luteous, femora with a superior dark line, double on the third; third tibiæ with 12 anterior, 16 posterior slender spines.

Abdomen, viewed from above, tapering very gradually from base to apex, bright red above, inclining towards luteous below, unspotted except for a double basal black spot on 1.

Superior appendages as long as 8, longer than 9 or 10, red, almost straight, apex acute, third fourth with an inferior row of about 8 denticles arranged in a curved line whose convexity is outwards (viewed from below). Inferior appendage about one-fifth shorter than superiors, luteous, triangular.

Genitalia of 2 not prominent. Anterior lamina less prominent than hamule and the latter than genital lobe. Anterior lamina somewhat bilobed at tip. Hamule bifid in its apical half, branches equal, inner branch slender, hook-like,

† Letter of July 15, 1898.

apex acute; outer branch thrice thicker, lamellate, straight, apex more obtuse. Genital lobe of about equal width throughout, apex rounded.

Wings:—reticulation reddish; pterostigma luteous, surmounting parts of two cells; membranule small, cinereous. One submedian cross-vein nearer the base than is the first antenodal; upper end of arculus between first and second antenodals, its sectors stalked; nodal sector not waved, one row of cells between the subnodal and the next supplementary sector below, no hypertrigonals.

Front wings:—10 antenodals, last not continued to median vein, 6 postnodals, internal triangle 3-celled, discoidal triangle with one cross-vein, followed by three posttriangular cells, then two rows for three cells to the level of separation of principal and median sectors, then three rows, afterwards increasing to 6 marginal cells. [N. B. Greater part of left front wing wanting.] Merest trace of yellow at the base.

Hind wings: 6 (right) 7 (left) antenodals, 6 (right) 7 (left) postnodals, no internal triangle, discoidal triangle free, its basal side in prolongation of the arculus. Between the short sector and the first sector of the triangle:—2 posttriangular cells, then 1 cell, then two rows increasing; sectors of the triangle separated at origin. Pale yellow at the base reaching out to the submedian cross-vein for the whole width of the wing.

Total length 34.5 mm., Abdomen 22. Superior appendages 1.5, the third tibiæ 5, front wing 30, hind wing 28, pterostigma 3.5.

Mr. Kirby (Cat. Odon. p. 22, 1890) has placed *hæmatodes* under *Crocothemis*, but the prothorax, with the neuration, indicates it to be a *Sympetrum* Newm. (*Diplax* Charp.). To the same genus belong also *Diplax pacificus* Kirby, later placed by him in *Trithemis*, and *Tri. rubra* Kirby, and these two may perhaps be nothing more than small individuals of *hæmatodes*.

7. **Libellula histrio** B. P. 849. [*Micrathyria berenice* Drury.]

Von New-York; in v. Winthem's Sammlung.

In the M. C. Z. one female with the written pin-label "L. histrio * Burm. New York", and the printed pin-label "Winthem".

8. **Libellula leucosticta** B. P. 849. [*Cacergates.*]

Vom Port natal; aus der Sendung des Herrn Dregé; auch in Aegypten und Senegambien (v. Winthem's Sammlung).

One male (T) under the blue drawer-label "leucosticta Burm. Port. nat. Drg." in B.'s hand, at Halle; no pin-label other than a bit of unmarked blue paper.

In the M. C. Z.: one male with the written pin-label "albisticta Br. Senegal", and the printed pin-label "Winthem"; one male with the written pin-label "Senegal", and the printed pin-label "Winthem"; one male with the printed pin-label "Winthem".

9. **Libellula imbuta** Hoffm [annse]gg [MS.], B. P. 850. [*Uracis.*]

Von Bahia, auch aus Surinam; gemein.

One male and one female, in the M. C. Z., each with the written pin-label "Bahia", and the printed pin-label "Winthem", may be types.

The male lacks the last six abdominal segments. In both ♂ and ♀ the brown at the apex of the wings begins on the front wings slightly proximal to the middle point of the pterostigma (and is 3.5 ♀, 3 ♂ mm. long), on the hind wings slightly distal to that point (2.5 ♀ 2 ♂ mm. long); there are no hypertrigonals on the front wings ♂ ♀, nor on the hind wings of the ♂, but there is a single hypertrigonal on both hind wings of the ♀; discoidal triangles of all wings ♂ ♀ with one cross-vein: front wings ♂ ♀ with one submedian cross-vein and the internal triangle of 3-cells. Hind wings ♂ ♀ with three submedian cross-veins (four on right hind wing of the ♀), but no internal triangle.

Total length ♂ — ♀ 33, Abdomen ♂ —, ♀ 22, front wing ♂ 27 ♀ 29, hind wing ♂ 26 ♀ 28, pterostigma (f. w.) ♂ 4. ♀ 4.

This species is the type of the genus *Uracis* Rambur. See Mr. Kirby's notes on variation in neuration (Ann. Mag. Nat. Hist.—6—xix, p. 605, 1897).

10. **Libellula fastigiata** B. P. 850. [*Uracis.*]

Von Bahia.

In the M. C. Z. one male with the written pin-label "L. fastigiata Burm. Bahia", and the printed pin-label "Winthem".

♂ type. The brown at the apex of the wings begins at the inner (proximal) end of the pterostigma and attains a length of 7 mm. (front) or 6 mm. (hind wings). One hypertrigonal on all the wings, all discoidal triangles with one cross-vein; front wings with five (right) four (left) submedian cross-veins, internal triangle two-celled (left), three-celled and irregular (right); hind wings with three (right) four (left) submedian cross-veins but not forming an internal triangle.

Total length 39 mm., abdomen 27, front wing 35, hind wing 33.5, pterostigma (f. w.) 5.

11. **Libellula lateralis** B. P. 850. [*Trithemis.*]

griseo-testacea, temporibus thoracisque lateribus nigro-variegatis; abdominis margine laterali apiceque nigro; alis subfumatis, posticis in basi fulvis, stigmatibus nigris. Long. 1¼″

Von der Comorischen Insel St. Johanna: mehrere Weibchen in Sommer's Sammlung.

Belongs to the group **Mit drei Zellenreihen hinter dem Dreieck der Vorderflügel, welche bis über die Mitte des ganzen Feldes hinausgehen and Flügelmahl wohl 4-5 mal so lang wie breit.**

One female under the blue drawer-label "lateralis Burm. Ins. Com. Sm." in B.'s hand, at Halle; no pin-label.

One female, in the M. C. Z., with written pin-label "L. lateralis Burm. * coll. Somer. Comor. Insel St. Juan" in Hagen's hand.

The following description is based on these two types; they differ slightly from each other; the M. C. Z. type is the larger.

♀ types. Vertex luteous, apex truncated. Face and lips yellow, a narrow black band on frons superiorly in front of vertex and eyes; inner margin of lateral labial lobes and a narrow median stripe on the median labial lobe blackish. Rear of eyes yellow with two black spots. Occiput luteous. Distance in which the eyes are in contact equal to the median, antero-posterior dimension of occiput.

Prothorax blackish, some yellow spots on either side above the bases of the first legs. Hind lobe quite small, smaller than the other lobes, hind margin entire.

Thorax luteous above, becoming yellowish on the sides below and on the pectus; the upper and lower ends only of the humeral suture, an oblique stripe on the lower part of the mesepimeron, a stripe on the site of the (obliterated) first lateral suture (not reaching the wing base however), a stripe on the second lateral suture, a stripe along the median side of the latero-ventral metathoracic carina, uniting with the preceding below and on the pectus with its fellow of the other side.—blackish.

Feet blackish; coxæ, trochanters, first and second femora inferiorly yellowish; third tibiæ with 12–14 anterior (external) 13–15 posterior (internal) slender spines.

Abdomen luteous; sutures, transverse carinæ (one supplementary transverse carina on both 2 and 3) a narrow mid-dorsal and two lateral longitudinal stripes on 2–3, lateral margins of 3–7, 8–10 entirely (except two small, basal, luteous spots on 8)—blackish.

Appendages blackish, longer than 10. Vulvar lamina neither produced nor excavated.

Wings slightly smoky. Pterostigma blackish-brown, surmounting one and parts of two other cells. Membranule small, pale. One submedian cross-vein nearer the base than is the first antenodal, upper end of the arculus between first and second antenodals, sectors of the arculus stalked, nodal sector not waved, no hypertrigonals, one to three double cells between subnodal and next supplementary sector below.

Front wings: 11–12 antenodals, last not continued to median vein; 8 postnodals; internal triangle 3-celled, discoidal triangle with one cross-vein; 3 posttriangular rows to beyond the level of the nodus. A faint yellowish, basal tinge reaching to the apex of the submedian space (Halle type), or confined to the extreme base of the wing (M. C. Z. type).

Hind wings: 8–9 antenodals, 9 (right) 10 (left) postnodals, no internal triangle, discoidal triangle free, its inner side barely nearer the base than the arculus is, two posttriangular rows increasing, sectors of the triangle barely (Halle type), or distinctly (M. C. Z. type) separated at origin. Faint yellowish basal tinge reaching outward to the triangle (Halle type), or to the level of the first antenodal, and backward to two cells beyond the apex of the membranule (M. C. Z. type).

Total length 30–34.5 mm., abdomen 20–23, third tibia 4.5–5, front wing 26–28.5, hind wing 25–28, pterostigma 3, abdominal appendages .75.

Are the females of *L. hæmatina* from Mauritius, Bourbon and Madagascar described by Rambur (Nèvr. p. 85) this species?

As above indicated *lateralis* is not an *Orthetrum*, as given in Mr. Kirby's Catalogue, page 38.

12. **Libellula longipennis** B. P. 850. [*Pachydiplax.*]

Von Mexico; ein Weibchen in Germar's Sammlung.

One female (♀) under the green drawer label "longipēnis Burm. Mexico" in B.'s hand, at Halle; no pin-label.

13. **Libellula stictica** B. P. 850. [*Trithemis.*]

nigra, fronte flava, summa cum tuberculo ocellari chalybæa; thorace flavo-guttato, supra pruinoso; abdominis segmentis lineola duplici flava; alis totis aqueis, stigmatibus nigris. Long. 1⅛".

Vom Port natal; ein Männchen aus der Sammlung des Hrn. Dregé.

One male (♂) under the blue drawer label "stictica Burm. Port. Nat. Drg." in B.'s hand, at Halle; no pin-label other than a bit of unmarked blue paper. A description follows:

♂ type. Vertex (artificially flattened) and upper surface of frons dark metallic blue. Remainder of frons, clypeus, lips and rear of eyes and of occiput yellow; margins of labrum and a median labral band, the median labial lobe, the inner third of the lateral labial lobes, two spots on the rear of the eyes and upper surface of the occiput—black. Eyes in contact for a distance little more than the antero-posterior dimension of occiput.

Prothorax black, its hind lobe very small.

Thoracic dorsum and sides superiorly pruinose; below yellow, with black stripes on the lower ends of the humeral, the (obliterated) first, and the second lateral sutures; the stripe on the last uniting on the pectus with its fellow of the opposite side.

Feet black, third tibiæ with 12-13 anterior (exterior), 14 posterior (interior) spines.

Abdomen black, with yellow markings as follows—two apical dorsal spots on 2; 3-8 with a longitudinal stripe on each side of dorsum, interrupted by black at the supplementary transverse carina on 3 and at rudiments (?) of the same on 4 and 5: sides of 1-3 except at transverse carinæ. The abdomen, when viewed from above, is slightly constricted at the base of 4, widening somewhat to the apex of 7, narrowing to 10.

Superior appendages as long as 9, black, apex fairly acute, a row of denticles on the under surface. Inferior appendage almost as long, rather stout, apex obtuse.

Genitalia of 2:—anterior lamina not prominent, its margin entire; hamule and genital lobe much more prominent. Hamule bifid, inner branch slenderer, slightly longer, curved backward to form a hook; outer branch straight, thrice broader, apex obtusely rounded. Genital lobe about as prominent as the inner hamular branch, longer (dorso-ventrally) than wide (antero-posteriorly), narrowing towards its apex (Pl. 1, fig. 6).

Wings:—Pterostigma blackish brown, surmounting one and parts of two other cells, membranule small, blackish; one submedian cross-vein, nearer the base than is the first antenodal; upper end of the arculus between first and second antenodals; sectors of the arculus stalked; no hypertrigonals; nodal sector not waved; two to three double cells between the subnodal sector and the next following supplementary sector. Wings uncolored.

Front wings:—9 antenodals, the last one not continued to the median vein; 7

postnodals: internal triangle 3-celled, discoidal triangle with one cross-vein; three posttriangular rows *to the hind margin* of the wing.

Hind wings:—7 antenodals, 8 postnodals, no internal triangle, discoidal triangle free, two posttriangular rows increasing, sectors of the triangle arising from the same point.

Total length 33 mm., abdomen 23, superior appendages 2, third tibia 5.5, front wing 28, hind wing 27. pterostigma 3.5.

14. **Libellula arteriosa** B. P. 850. [*Trithemis.*]

testaceo-rufa, abdomine et fronte summa sanguineis, alis hyalinis in basi fulvis, venis omnibus sanguineis, stigmatibus fuscis. Long. 1¼".

Vom Port natal; ein Männchen, ebendaher.

One male (♂) under the blue drawer-label "arteriosa Burm. Pr. b. sp. Drg." in B.'s hand, at Halle; no pin-label other than a bit of unmarked blue paper. The following notes were made on the type:

♂ (type). The fulvous coloring on the wing-bases is, on the front wings, confined to the subcostal and submedian spaces, reaching not as far as the first antenodal and the submedian cross-vein respectively. On the hind wings, it reaches in the costal and median spaces half-way to the first antenodal, in the subcostal and submedian spaces to slightly beyond the first antenodal; in the submedian space it therefore reaches to beyond the cross-vein; below (posterior to) the submedian space it reaches only as far as the apex of the membranule and outwards for but two cells from the membranule. The black on the labrum is confined to the middle of the anterior margin. The genital hamule is much more like the figure I have given (Proc. U. S. Nat. Mus. xvi, p. 585, 1893) of the hamule of *rubrinervis* Selys than Dr. Karsch's figure of that of *arteriosa* (in Berl. Ent. Zeit. xxxix. p. 12, 1894). Abdomen 24 mm., hind wing 27.

When at Halle I had with me a male from Ndi, Zanzibar, by Hildebrandt, given me, as *arteriosa*, at the Museum für Naturkunde in Berlin; I noted at the time that the type of *arteriosa* agrees with this male in other respects than those mentioned above. This male is now before me. It is slightly smaller—abdomen 22, hind wing 25; the brownish yellow at the base of the front wings reaches to the second antenodal and the arculus and even a short distance beyond the latter in the submedian space; on the hind wings the same coloring reaches to the third antenodal and the triangle, and from the anterior margin of the wing almost to the posterior; black is the predominant color on the labrum, only two isolated basal fulvous spots remaining; the hamule agrees with the figure of that of *rubrinervis* cited above. With this male from Zanzibar agrees a male from Nossibé given to me subsequently by Baron de Selys as *arteriosa*.

15. **Libellula rufinervis** B. P. 850. [*Dythemis.*]

Von St. Domingo, in Sommer's Sammlung.

I have not seen the type which is in the Hofmuseum at Vienna (Prof. Brauer).

16. **Libellula pedemontana** Fab. P. 851. [*Sympetrum* Newm.. *Diplax* Charp.]

Im südlichen Europa.

Three males, two females, under the white drawer-label "pedemontana Fabr. Charp. Gallia v. W." in B.'s hand, at Halle; no pin-labels. One male in the M C. Z. with the written pin-label "Coll. Germar pedemontana Fabr. Type Burm. Austria" in Hagen's hand; Hagen's copy of B. has no * before the name of this species.

Following the last-quoted sentence *from Burmeister* is this one:

Hieher noch L. trivirgata M. B. in litt. und wahrscheinlich auch Lib. braminea Fabr. suppl. 284.

One female under the yellow drawer-label "trivirgata M. B. Java. Hoffmgg." in B.'s hand, at Halle; no pin-label. No description of *trivirgata*, however, seems ever to have been published.

17. **Libellula vulgata** Linn. P. 851. [*Sympetrum.*]

Ueberall gemein.

Two females under the white drawer-label "vulgata Lin. Fabr. Charp. Europa omnis" in B.'s hand, at Halle; no pin-labels.

18. **Libellula flaveola** Linn. P. 851. [*Sympetrum.*]

Gemein in ganz Europa.

One male, two females, under the white drawer-label "flaveola Lin. Fabr. Charp. Europa omnis" in B.'s hand, at Halle; no pin labels.

19. **Libellula albifrons** B. P. 851. [*Leucorhinia.*]

Bei Berlin, auch aus der Schweiz.

One male (♂) under the white drawer-label "albifrons Burm. Berolini" in B.'s hand, at Halle; no pin-label. One male in the M. C. Z. with the written pin-label "Coll. Germar. mesoleuca Imh. albifrons B. Helvetia"; the words "Coll. Germar" are in Hagen's hand. Hagen's copy of B. has no * before this name.

The following note is from p. 61 of De Selys and Hagen's Revue des Odonates de l'Europe (1850): "M. Burmeister a sans doute cru que la couleur blanche des appendices anals indiquait une variété, parce qu'il avait vu dans d'autres collections la *dubia* qu'il avait regardée comme la même espèce, mais cet entomologiste et M. Germar se sont assurés depuis que l'individu type dans le musee de Halle, envoyé par M. Imhoff, est bien notre *albifrons* à appendices blancs."

20. **Libellula nigra** Vand. Lind. P. 851. [*Sympetrum scoticum* Donov.]
In Deutschland und Italien.

One male under the white drawer-label "nigra v. Lind. Charp. Sundiae" in B.'s hand, at Halle; no pin-label. One male in the M. C. Z. with the written pin-label "coll. Germar. *nigra* Lind. Veronensis Charp. Sylvatica Hans. Typus Burm."; the words "coll. Germar" and "Typus Burm." are in Hagen's hand.

21. **Libellula pectoralis** Charp. P. 851. [*Leucorhinia.*]
Nicht selten in Deutschland, bei Stralsund, Berlin, Halle; auch in Holland und England.

One male, three females, under the white drawer-label "pectoralis Charp. dubia v. Lind. Europa" in B.'s hand, at Halle; no pin-labels. *Dubia* v. Lind. is distinct.

22. **Libellula Tillarga** Fab. P. 852. [*Tholymis.*]
Von Madras; in v. Winthem's und der Hallenser Sammlung von Hrn. King; auch vom Hrn. Grafen v. Hoffmannsegg als L. versicolora de Haan.

Two males under the yellow drawer-label "Tillarga Fbr. versicolora d. Haan. Java Hoffing." in B.'s hand, at Halle, no pin-labels. One male in the M. C. Z. with the yellow, written pin-label "coll. Germar Tillarga B. braminea Fabr. versicolora d.H Java Br. Typus Burm. II 852. 22"; the words "coll. Germar" and "Typus Burm. II 852. 22" are in Hagen's hand.

Expressions used by Hagen (Stet. Ent. Zeit. xxviii, p. 221, 1867) imply that he had studied B.'s type of *Tillarga.*

23. **Libellula analis** (de Haan) B. P. 852. [*Pantala flavescens* F.]
Ebendaher, auch unter dem angeführten Namen von Herrn Grafen v. Hoffmannsegg.

Two males (♂) under the yellow drawer label "analis d. Haan Madras King Java Hoffm." in B.'s hand, at Halle; one has a pink pin-label "16", the other none. One male in the M. C. Z. with the yellow, written pin-label "coll. Germar analis d. H. Typus Burm. II. 852. 23. Java Br."; the words "coll. Germar" and "Typus Burm. II. 852. 23." in Hagen's hand.

24. **Libellula terminalis** B. 852. [*Pantala flavescens* F.]
Aus Brasilien, in Sommer's Sammlung.

I have not seen the types which (two individuals) are in the Hofmuseum at Vienna (Prof. Brauer). Hagen's copy of B. has * — before this name, but there is no B. specimen in the M. C. Z.

25. **Libellula basalis** B. P. 852. [*Tramea.*]
Aus Brasilien; in Sommer's Sammlung.

I have not seen the type which is in the Hofmuseum at Vienna (Prof. Brauer).

26. **Libellula carolina** Linn. P. 852. [*Tramea.*]
♀. Aus Nord-Amerika; in Sommer's Sammlung.

I can learn nothing of B.'s specimen.

27. **Libellula chinensis** de Geer. P. 852. [*Tramea.*]
Aus China und Ostindien: die Hallenser Sammlung erhielt ein schönes Weibchen von Hrn. King in Madras.

One female under the yellow drawer-label "chinensis De Geer Madras King" in B.'s hand, at Halle; no pin-label. One individual in the Hofmuseum at Vienna (Prof. Brauer).

28. **Libellula Phyllis** Sulzer. P. 853. [*Rhyothemis.*]
Aus Java; die Hallenser Sammlung erhielt diese Art vom Hrn. Grafen v. Hoffmannsegg.

Two females under the yellow drawer-label "Phyllis Sulz Euphrosyne d. Haan. Java Hoffm. "in B.'s hand, at Halle; one has a pink pin-label "21", the other none. Hagen's copy of B. has * — before this name, but there is no B. specimen in the M. C. Z.

29. **Libellula Murcia** Fab. P. 853. [*Rhyothemis variegata* L.]
Von Madras, durch Hrn. King.

Two males under the yellow drawer-label "Murcia Fabr. Drur. Madras King." in B.'s hand, at Halle; no pin-labels.

Baron de Selys has given reasons for regarding this species—which is properly *Marcia* Drury 1773, not *Murcia* Fabr. 1793—as the male of *variegata* Linn. 1767 (Ann. Mus. Civ. Gen.—2—x, p. 440, 1891).

30. **Libellula Eponina** Drur. P. 853. [*Celithemis.*]
In Nordamerika, mir in natura nicht vorgekommen.

31. **Libellula indica** Linn. P. 853. [*Rhyothemis variegata* L.]
In Ostindien; die Hallenser Sammlung erhielt 2 Stück durch Hrn. King vom Missionär Hrn. Schmidt.

Three females under the yellow drawer-label "indica Fabr. variegata Lin. Arria Drury. Madras King" in B.'s hand, at Halle; no pin-labels.

32. **Libellula Fulvia** Fab. P. 853. [*Neurothemis.*]
In China.

B. mentions no collection and I have seen no specimens of his.

33. **Libellula fluctuans** Fab. P. 853. [*Neurothemis.*]

L. vidua Hagenb. in litt. In Java, vom Herrn Grafen v. Hoffmannsegg.

Two males under the yellow drawer-label "fluctuans Fbr. vidua Hag. elegans Guer. Java Hoffmgg." in B.'s hand, at Halle; no pin-labels.

34. **Libellula pullata** B. P. 854. [*Diastatops obscura* F.?]

Aus Surinam; in Sommer's Sammlung.

I have not seen the type which is in the Hofmuseum at Vienna (Prof. Brauer). The species is referred to the genus *Diastatops* Rambur and Mr. Kirby gives some reasons (Ann. Mag. Nat. Hist. —6—xix, p. 602. 1897) for thinking it identical with *D. obscura* Fabr. which follows—

35. **Libellula obscura** Fab. P. 854. [*Diastatops.*]

Von Bahia, in v. Winthem's Sammlung.

One female in the M. C. Z. with the written pin-label "obscura Fab. * Bahia" and the printed pin-label "Winthem".

36. **Libellula dimidiata** Fab. P. 854. [*Diastatops.*]

Aus Surinam, in Sommer's und der Hallenser Sammlung.

One male under the green drawer-label "dimidiata Fabr. Br. margin. d. Geer. Surin. Smr." in B.'s hand, at Halle; no pin-label. Hagen's copy of B. has * — before this name, but there is no B. specimen in the M. C. Z.

37. **Libellula fasciata** Fab. P. 854. [*Zenithoptera.*]

Von Bahia, in Sommer's Sammlung; wahrscheinlich einerlei mit L. americana Fabr. Entom. Syst. II, 380, 31.

I have not seen any B. specimen. Hagen's copy of B. has * — before this name, but although there is an *americana* from Winthem's collection in the M. C. Z., there is apparently no B. specimen there.

38. **Libellula ochracea** B. P. 854. [*Trithemis.*]

flavo-testacea, segmentis abdominalibus utrinque macula fusca; alis in basi late fulvis, stigmatibus elongatis cinereis. Long. 1".

Von Bahia, in v. Winthem's Sammlung.

Two males in the M. C. Z., one with the written pin-label "L. ochracea Br. * Bahia"; the other with the written pin-label "L. ochracea * Br." in Hagen's hand; both have printed pin-labels "Winthem"; the second male mentioned has lost the abdomen so

that its sex as given, although probable, is not certain. Hagen says (Proc. Bost. Soc. Nat. Hist. xv, p. 375, 1873) "Having before me the type of *D. ochracea* Burm.," etc. A description of these two types follows:

♂ types. Yellow passing into olive on the frons and labrum, into brown on vertex, occiput, thoracic dorsum, and on either side of the apices of abdominal segments 2-10 as a (usually triangular) spot.

Legs luteous, somewhat darker on the anterior surfaces.

Eyes in contact for only about ½ mm., or about one-third the length of the occiput.

Hind lobe of the prothorax smaller than the other lobes, rectangular, with the angles rounded off, its transverse dimension greater than its antero-posterior, hind margin entire.

Superior abdominal appendages as long as 9, luteous, slender and subcylindrical when viewed from above; viewed in profile, arched in their basal half, apical half nearly straight; inferior margin of the third fourth of the appendage with a row of five denticles ending abruptly distally, whence the apex tapers to an acute point. Inferior appendage not more than one-tenth shorter, extending considerably beyond the denticles of the superiors, triangular, rather slender, about one-and-a-half times as long as its greatest width (at the base).

Genitalia of abdominal segment 2 inconspicuous, genital lobe most prominent, hamule bifid at tip, inner branch slender, forming a round hook with a black tip, outer branch longer, three times wider, obliquely truncated with angles rounded off. Genital lobe trapezoidal, its tip truncated so that its anterior margin is about one-and-a-half times as long as its posterior margin.

Wings clear, reticulation reddish at base, elsewhere blackish. Pterostigma ochreous, surmounting one cell and parts of two others. Membranule blackish. Upper end of arculus between first and second antenodals (or at the second, hind-wing of one ♂), its sectors distinctly stalked, separated throughout by one row of cells only (or 2 cells at margin of hind wing 1 ♂), supplementary sector next below the subnodal sector separated from it by one row of cells; one submedian cross-vein, nearer the base than is the level of the first antenodal: nodal sector not waved, separated from the subnodal by one row of cells except at the margin of the wing, no hypertrigonals.

Front wings with 9-10 antenodals, the last not continuous, 7-8 postnodals triangle with one cross-vein, internal triangle of three cells; three posttriangular cells, then two rows to beyond the level of the origin of the subnodal sector (or two rows from the triangle outwards—1 ♂) then three rows almost to the wing margin, with four marginal cells. Yellow at base for the entire width of the wing out to the level of the arculus.

Hind wings with 7-8 antenodals, 8-9 postnodals, triangle free, its proximal side in prolongation of the arculus, no internal triangle; posttriangular cells 2, 1, 2, 2, 3 + ... 8-9 marginal cells, sectors of triangle united at origin. Yellow at the base for the entire width of the wing to the third antenodal and to the level thereof on front and hind margins respectively, and filling the greater part of the triangle and adjoining cells.

Total length 27, abdomen 17.5, front wing 23-24, hind wing 21.5–23, pterostigma 3.

Mr. Kirby says (Ann. Mag. Nat. Hist.—6—xiv, p. 263, Oct. 1894) "*ochracea*, Burm., should have only two rows of post-triangular cells, instead of one or more rows of three, followed by one or more rows of two increasing, as in typical *Trithemis*". This statement was probably based on Burmeister's placing it in a group having "Gleich anfangs zwei Zellenreihen in dem Felde hinter dem Dreieck der Vorderflügel" (B. p. 854). The same cause probably led Mr. Kirby to refer *ochracea* Hag. (nec. Burm.), *fervida* Erichson and *justina* Selys to *pulla* Burm. The above description of the two types of B. shows, however, that this character is subject to individual variation, as I can find no reason for regarding these two individuals as of different species. The three names quoted are therefore, I believe, to be referred back again to *ochracea* Burm., as they were given by Hagen (Proc. Bost. Soc. Nat. Hist. xviii, p. 81, 1875) and Kirby (Cat. Odon. p. 19, 1890). From the description of *L. pulla* B., given *post*, it will be seen that it closely approaches *ochracea* B. Whether the two are really distinct is a question yet to be decided by a revision of these American species which have been referred to *Trithemis* Brauer.

39. **Libellula castanea** B. P. 854. [*Sympetrum?*]

castanea, alarum hyalinarum basi umbra castanea, posticarum majori; stigmatibus elongatis cinereis. Long. 1" 1½"'.

Von Bahia. Ebenda.

Two males in the M. C. Z., both with printed pin labels "Win them"; one with the written pin-label "L. castanea Br. ♂ and ♀ * Bahia" (I found no female to which this label refers); the other with the written pin-labels "Brasil" and "L. castanea * Burm.," the last one in Hagen's hand.

A description of the types follows:

♂ (types). Almost entirely reddish-brown, labium and first and second femora darker. Vertex with a very narrow tip, which is bifid. Eyes in contact for a very short distance (one-third to one-fourth of the length of the occiput).

Hind lobe of prothorax almost as wide as the middle lobe, subrectangular with the angles rounded off, hind margin with but the slightest indication of a median notch.

Hind tibia with 8-9 spines on the anterior (outer) row, 8-9 on the posterior (inner).

Superior abdominal appendages as long as 9 + 10, red, curved somewhat downward in the basal half, thickened before the apex, third fourth with an inferior row of six black denticles, after which the appendage, viewed in profile, is truncated obliquely upward and backward to form the moderately acute and slightly upturned apex. Inferior appendage about one-fifth shorter, reaching slightly

beyond the denticles of the superiors, hardly longer than it is wide at base, its tip one-fourth to one-third as wide as base, with the usual two upturned denticles.

Genitalia of abdominal segment 2: Anterior lamina inconspicuous, its margin entire. Apex of hamule bifid, inner branch slender, curved to form a hook, outer branch twice as long and as thick, its tip rounded. Genital lobe a little more prominent than the hamule, about one-and-a-half times as long as wide, tip rounded. (Pl. I, fig. 5).

Wings slightly smoky throughout, reticulation black. Pterostigma reddish-brown, surmounting one cell and parts of two others. Membranule blackish. Upper end of arculus at the second antenodal or slightly nearer, its sectors stalked, nodal sector not waved, supplementary sector next below the subnodal separated from it by but one row of cells. All discoidal triangles with one cross-vein. No hypertrigonals.

Front wings: 12-14 antenodals, the last not continuous, 8-10 postnodals, one submedian cross-vein nearly on a level with the first antenodal, internal triangle of three cells, three posttriangular cells for one cell (two wings) or two cells (two wings) then two rows to the level of the origin of the subnodal sector increasing to six marginal cells. Brownish yellow at base reaching to submedian cross-vein or not quite so far.

Hind wings: 9-10 antenodals, 9-10 postnodals, two submedian cross-veins, two posttriangular rows (between short sector and first sector of triangle) to the level of the separation of the median sector increasing to 9-11 marginal cells sectors of the triangle a little separated at origin. Brownish yellow at base, reaching out to the first antenodal but not attaining the hind margin of the wing by one-fourth of the width of the wing.

Total length 32. Abd. 20. F. W. 28. H. W. 27. Pter. 3. Sup. app. 1.5 hind tibia 5.

The systematic importance of two neurational details which are symmetrically developed on these two types: the hind wings having a cross-vein in the discoidal triangle and two submedian cross-veins, is diminished by the circumstance that in the Mus. Comp. Zool. are two males in which I can discover no specific difference from *castanea*, one of which has the triangles of both hind wings with a cross-vein, one submedian cross-vein on the right side, two on the left, while the other male has these triangles free and but one submedian cross-vein on each side. A third male agrees with *castanea* types in these regards, as does a male in my collection. Of three females in the Mus. C. Z. which seem to belong to this species, one has the triangles free, two have them crossed on both sides, two have two submedian cross-veins on one side only, one has but one submedian cross-vein on each side, a female in my own collection has the triangle free and two submedian cross veins each side — these statements referring to the hind wings only.

40. **Libellula Domitia** Drury. P. 855. [*Perithemis.*]

In Nordamerika und Westindien; in Sommer's Sammlung.

Two males under the green drawer label "Domitia Drur. St. Cruz Smr." in B.'s hand, at Halle, no pin-labels, have on the front wings two posttriangular rows afterwards increasing, although B. places Domitia as the first species under a section "Gleich anfangs d r e i Zellenreihen in dem Felde hinter dem Dreieck der Vorderflügel." One of these males has the internal triangle of the front wings two-celled, the other male has it one celled in front wings; the latter shows a clear, not yellowish, but ill-defined band on all the wings between the triangle and the nodus.

Hagen's copy of B. has * opposite this name, but there is no specimen of *Domitia* from Sommer's collection in the M. C. Z., although there is a Brazilian male from Winthem's there.

I have discussed the question of specific characters based on neuration in this genus in a paper soon to be published in the Proceedings of the California Academy of Sciences.

41. **Libellula pulla** B. P. 855. [*Trithemis.*]

alis hyalinis, in basi fusco-fulvis, tesselatis; corpore testaceo-cinereo, frontis macula ocellorumque tuberculo cyaneis. Long. 10½‴.

Aus Surinam, in Sommer's Sammlung. Diese Art zeichnet sich noch dadurch aus, dass nur in den 2 ersten Querreihen hinter dem Flügeldreieck 3 Zellen liegen, in den 4 folgenden aber 2.

One male (T) below the green drawer-label "pulla * Surin. Smr." in B.'s hand, at Halle; no pin-label.

A description follows:

♂ (type). Vertex bifid, metallic blue, as also the frons except for a small yellow spot on either side. Eyes in contact for a distance less than the antero-posterior dimension of the occiput, which is brown above, yellow behind. Clypeus olive, lips yellow, labrum with a median basal brown spot. Rear of the eyes yellow, with a lacerated blackish band on the inner (median) margin.

Hind lobe of the prothorax yellow, subrectangular, with angles rounded, not as wide as the middle lobe, with a median impressed line.

Thorax yellowish with diffuse brown markings on dorsum, perhaps effects of desiccation, and interrupted brown stripes on humeral, (obliterated) first lateral, and second lateral sutures, on mesepimeron and on metepimeron, uniting with each other at the bases of the feet.

Feet dark brown, coxæ, trochanters and inferior surfaces of femora paler. Third tibiæ with 11 anterior (external), 14 posterior (internal) slender spines.

Abdomen tapering very slightly from 2 to 10, yellowish; all carinæ and sutures, the greater part of 4-7 (leaving only a basal yellow spot on either side of dorsum) and 8-9 *entirely*, blackish-brown; 10 and the appendages luteous. Superior appendages as long as 9, with an inferior, angular dilatation at two-thirds

their length, on the basal side of which is a row of 3-4 denticles; apex acute. Inferior appendage but little shorter, triangular, extreme apex truncated, with the usual two upturned denticles.

Genitalia of 2: Anterior lamina hardly projecting beyond the lateral margins of 2. Hamule bifid, inner branch slender, hook-like; outer branch longer, wider, lamellate, apex obliquely truncated from within outward and ventralward. Genital lobe much more prominent than the preceding parts; apex truncated from behind forward and ventralward, wider than the base, and in contact with that of its fellow of the opposite side so that the two genital lobes form a sort of hood for the hamules. (Pl. I, fig. 10).

Wings:—Pterostigma luteous surmounting one and parts of two other cells, membranule cinereous, reticulation blackish. Sectors of the arculus stalked, no hypertrigonals, one submedian cross-vein, nearer the base than is the first antenodal, nodal sector not waved, only one row of cells between the subnodal sector and the supplementary sector next below.

Front wings:—Upper end of arculus between first and second antenodals, 10 antenodals, the last not continued to median vein, 8 postnodals, internal triangle 3-celled, discoidal triangle with one cross-vein; three posttriangular rows for two cells, then two rows for four cells, then three rows (beginning near the level of the last antenodal) almost to the wing-margin; this corresponds to the strongly pronounced curving forward of the first sector of the triangle, which reaches its maximum at the level of the point of separation of the principal and median sectors. Base of the wings yellowish-brown for almost their entire width and reaching outward to the first antenodal, the arculus and the inner (basal) side of the internal triangle.

Hind wings:—Upper end of arculus almost at the second antenodal, 8 antenodals, 8 (right) 9 (left) postnodals, no internal triangle, discoidal triangle free, two posttriangular rows increasing, sectors of the triangle arising from the same point. Base of the wings yellowish-brown, reaching outward to the fourth antenodal and the apex of the triangle; as in the front wings the central part of each cell is clearer, whence Burmeister's "tessellatis".

Total length 30 mm. Abdomen 19. Superior appendages 1.3. Third tibia 5. Front wing 24. Hind wing 23. Pterostigma 3.

Hagen's copy of B. having a * — opposite this name is the reason for mentioning a specimen (abdomen lost, but probably a female from the small amount of color on the wings) in the M. C. Z., having the written pin-label "L. pulla Br. Surinam" in an unknown hand, and a modern type label. It differs from the above description in having on the front wings 9 antenodals, two rows of posttriangular cells from the triangle to the level of the nodus, pale yellow at base to not quite as far as the submedian cross-vein.

Hind wings with 7 antenodals, 7 postnodals, posttriangular cells 2.1.1 2+. (right), 2.1.2+. (left) (i.e. between short sector and the first sector of the triangle); sectors of the triangle separated at origin; base of the wings pale yellow to the level of the first antenodal.

Length of head and thorax 8.5, front wing 19, hind wing 18, pterostigma 2.

Should this female be not conspecific with the above male, the male is of course fixed as the type by the neuration in the posttriangular field mentioned by B.

42. **Libellula equestris** Fab. P. 855. [*Neurothemis tullia* Drury.]
Var. L. feralis M. B. in litt.
Von Madras, durch Hrn. King.

One male, one female, under the yellow drawer label "equestris Fabr. Madras King" in B.'s hand, at Halle; the male without pin-label, the female with the yellow pin-label "feralis M. Ber. Graf. v. Hoffgg."

43. **Libellula unimaculata** de Geer. P. 855. [*Trithemis.*]
Aus Surinam, in Sommer's Sammlung.

I have not seen B.'s specimens which (two) are in the Hofmuseum at Vienna (Prof. Brauer, who refers them to *Erythrodiplax*). *Unimaculata* Burm. (nec de Geer, Rambur) has recently been placed as a synonym of *pulla* Burm. by Mr. Kirby (Ann. Mag. Nat. Hist.—6—xiv, p. 263, 1894).

44. **Libellula connata** B. P. 855. [*Erythrodiplax.*]
♂. Von Valparaiso, in Sommer's Sammlung.

One male in the M. C. Z. with the written pin label "L. connata * Br. Valparaiso Peru" in an unknown hand, to which the words "coll. Sommer" have been added by Hagen. A few notes on this type follow:

♂ (type). The "tota cyanea" of the frons is a very dark blue becoming black on the clypeus and lips. Thorax dark brown, with indistinct black lines on the humeral and lateral sutures and the latero-ventral metathoracic carina; the metepimeron has a greenish tinge. First two abdominal segments dark brown, the others black, pruinose above. Superior appendages as long as 9, black, straight, with denticles below, apparently of the usual shape, the inferior appendage about one-eighth shorter. Genitalia of 2 not easily examined, of the style of *Trithemis*.

Neurational details throughout as given for *ochracea*, *ante*, except as follows: front wings with 10 antenodals, 7 postnodals, three posttriangular rows to the level of the nodus, then increasing to 5 6 marginal cells; hind wings with 7-8 antenodals, 7 postnodals, two posttriangular rows increasing to 10-11 marginal cells. A slight brownish tinge at the extreme base of the front wings not reaching as far as one cell in the postcostal space. On the hind wings there are two dark brown basal streaks, one chiefly in the subcostal space to the first antenodal; the other in the submedian space to about the same level, it "overflows" into the postcostal cells adjoining the membranule, but does not extend backward (caudad) beyond the apex of this latter.

Total length 32 mm., abdomen 20, front wing 25.5, hind wing 24, pterostigma 3.5.

45. **Libellula fallax** B. P. 855. [*Trithemis umbrata* L.]
Aus Surinam, in Sommer's Sammlung.

I have not seen the type which (a female) is in the Hofmuseum

at Vienna (Prof. Brauer). Hagen, writing of *umbrata* L., has "Burmeister's Typen habe ich sämmtlich prüfen können. Es gehört von seinen Arten her Heb. T. II pag. 855 u. 856 Lib. umbrata aus Surinam und Brasilien, L. fallax aus Surinam in Sommer's Sammlung, ein altes ausgefärbtes Pärchen aus Surinam, L. subfasciata aus Rio, ein halb ausgefärbtes Männchen in Sommer's Sammlung, L. tripartita aus Cuba, in Winthem's, jetzt in meiner Sammlung, ein stark ausgefärbtes mittelgrosses Männchen mit grossem Basalfleck der Hinterflügel, endlich L. ruralis aus St. Thomas, ein Weibchen in der Hallenser Sammlung" (Stet. Ent. Zeit. xxix, p 278, 1868).

Prof. Brauer, in his oft-quoted letter of July 15, 1898, to me, refers *umbrata* to *Erythrodiplax*.

46. **Libellula subfasciata** B. P. 855. [*Trithemis umbrata* L.]

♂. **Aus Brasilien, in Sommer's Sammlung.**

I have not seen the type which (a male) is in the Hofmuseum at Vienna (Prof. Brauer). See note under No. 45.

47. **Libellula tripartita** B. P. 856. [*Trithemis umbrata* L.]

Von Kuba, in v. Winthem's Sammlung.

One male in the M. C. Z., with the printed pin label "Winthem", and the written pin label "3 partita Br. Cuba *". See note under No. 45.

48. **Libellula umbrata** Fab. P. 856. [*Trithemis.*]

Aus Surinam und Brasilien.

Two males under the green drawer-label "umbrata Fabr. d. Geer Bras. v. W." in B.'s hand, at Halle; no pin labels. Some later additions stand with these.

One male in the M. C. Z. with the printed pin-label "Winthem" and the written pin-label "umbrata Fab. Bahia."

See note under No. 45.

49. **Libellula ruralis** B. P. 856. [*Trithemis umbrata* L.]

Von St. Thomas.

Two females (♀) below the green drawer-label "ruralis * St. Thom. v. W." in B.'s hand, at Halle; no pin-labels.

See note under No. 45.

50. **Libellula plebeja** B. P. 856. [*Mesothemis.*]

griseo-fusca, abdomine in basi globoso; alis griseis, stigmatibus brevioribus flavescentibus. Long. 1¼".

Aus Südamerika.

One female (♀) below the green drawer-label "plebeja * Bras. v. W." in B.'s hand, at Halle; no pin-label. A description follows:

♀ (type). General color dark luteous, faded, lips brighter. Tip of vertex bifid, eyes barely touching above. Hind lobe of the prothorax nearly as wide as the middle lobe, entire.

Thorax perhaps green in life; a blackish antehumeral stripe not reaching the front wing-base.

Third tibiæ with 8 anterior (external), 8 posterior (internal) strong spines.

Abdomen, viewed from above, swollen at 2 and 3, slightly constricted behind the base of 4, of approximately equal width in 5–10. Viewed from the side, it is greatly swollen at 2 and 3 Probably an elongate yellow spot on each side of dorsum of 4–7 in life. Ventral surface partly pruinose.

Appendages pale, slightly longer than 10, shorter than 9. Vulvar lamina produced into an erect, triangular and very prominent trough-like piece.

Wings: reticulation blackish-brown, many cross-veins paler. Pterostigma luteous, surmounting one and parts of two other cells. Membranule cinereous, paler at extreme base. Upper end of arculus between first and second antenodals, no hypertrigonals, nodal sector not waved, only one row of cells between the subnodal sector and the next following supplementary sector, one submedian cross-vein, sectors of the arculus stalked.

Front wings:—Submedian cross-vein on a level with the first antenodal: 14 (right) 13 (left) antenodals, the last not continued to the median vein; 9 (right) 10 (left) postnodals: internal triangle 3-celled, discoidal triangle with one cross-vein, three posttriangular rows increasing at the level of the nodus. Only the barest trace of yellow at the base of the wings.

Hind wings:—Submedian cross-vein nearer the base than is the first antenodal; 9 (right) 10 (left) antenodals, 11 postnodals; no internal triangle, discoidal triangle free, its basal side in the prolongation of the arculus; two posttriangular rows between the short sector and the first sector of the triangle, sectors of the triangle separated at their origins. Yellow at the base of the wings reaching to the submedian cross-vein and back to the apex of the membranule, but the central parts of the cells are clearer.

Total length 40 mm., abdomen 28, appendages .6 mm., third tibiæ 5.5, front wing 33, hind wing 32, pterostigma 4.

Mr. Kirby (Cat. Odon. p. 39, 1890) has referred this species to *Lepthemis*. The proportions of wings and abdomen agree rather better with those of *Mesothemis* or *Erythemis*, and until more definite distinctions are drawn between these two it seems best to call this species *Mesothemis plebeja*.

51. **Libellula discolor** B. P. 856. [*Orthemis ferruginea* Fab.]

♂ ♀. In Brasilien;

One male (T), one female (T), below the green drawer-label "discolor * ♂ & ♀ Bras. v. W." in B.'s hand, at Halle; no pin labels.

52. **Libellula caffra** B. P. 856. [*Orthetrum.*]

cinereo-flava, vitta thoracis dorsali et laterali duplici albida; alis in summo apice paululum fuscis, stigmatibus fulvis. Long. 1¼".

♂. genitalibus superioribus valde prominulis.

♀. abdominis segmento octavo utrinque appendiculato.

Vom Port natal, aus der Sendung des Hrn. Drège.

One male (T), one female (T), under the blue drawer-label "caffra

* Pr. b. sp. Drg." in B.'s hand, at Halle; no pin-labels except a bit of unmarked blue paper on the pin of the male. A description follows:

♂ (type). Vertex blackish, bifid, apices not acute. Frons olive in front, yellowish on the sides with the two vertical and the one horizontal carinæ characteristic for *Orthetrum*. Clypeus paler olive. Lips and rear of head luteous. Occiput olive above: rear of occiput with a distinct median vertical groove.

Prothorax luteous, middle lobe reddish; hind lobe not as wide as the middle lobe, its hind margin entire.

Thoracic dorsum luteous, the sides darker brown. A narrow black antehumeral stripe not reaching the base of the front wing; along its inner (median) side runs an indistinct, pale olive stripe. Mesepimeron and *metepimeron* each with a pale yellow stripe margined with black at their lower ends, ill-defined at their upper ends. Tergal sclerites in interalar space pale yellow, axillary calli brown.

Femora blackish, reddish-brown on their superior surfaces near the base.

Tibiæ blackish, the first luteous superiorly near base; the third with 10 anterior (external), 8 posterior (internal) spines.

Tarsi luteous superiorly, blackish inferiorly.

Abdomen widest at base of 3, constricted and narrowest at base of 4, widening to apex of 5, 9 and 10 of equal width; luteous at base and inferiorly; colors on dorsum mostly faded, formerly apparently luteous with black marginal bands to the segments.

Superior appendages longer than 9, not as long as 9 + 10, black, almost straight when viewed from above, with fairly acute apices; viewed from the side, thickest at base and at three-fourths their length, of the usual form for *Orthetrum*, with a row of 10 11 denticles on the inferior surface, apex acute, directed slightly upwards.

Inferior appendage about two-thirds as long, not reaching to the last (distal) denticle of the superior appendages, triangular and with straight sides when viewed from below, apex truncated and terminating in two upturned denticles.

Genitalia of 2 agreeing with my description of those of *truncatum* Calv., but not easily examined owing to the partial protrusion of the penis; the hook on the outer side of the internal hamular branch very distinct.

Wings hyaline, but with a slightly smoky tinge. Costa as far as the pterostigma, the antenodals in the subcostal space and the cross-veins between the median vein and the upper sector of the arculus yellow on all the wings; all other veins black. Nodal sector distinctly waved. Supplementary sector next below the submodal separated from it by two rows of cells at a level corresponding to that of the middle postnodals. Supplementary sector next below the short sector separated from it by one row of cells throughout. Upper end of arculus at the second antenodal. One submedian cross-vein slightly nearer the base than the first antenodal is. Pterostigma yellow, surmounting one and parts of two other cells (two cells and small parts of two others on left front wing).

Front wings with 12 antenodals, the last continued to median vein, 10 postnodals; submodal and nodal sectors parallel and separated by but a single row of cells except at margin where there are two rows for a length of 2-3 cells; internal triangle of 3 cells; discoidal triangle with one cross-vein, followed by three posttriangular rows not increasing until on a level with the last antenodal; first sector

of the triangle forming a high curve; 10 marginal cells between the short sector and the first sector of the triangle. One hypertrigonal.

Hind wings with 9 antenodals, 10 (right) 11 (left) postnodals; subnodal sector not so much waved as the nodal, therefore not entirely parallel, but separated by a single row of cells: triangle free, its basal side very slightly nearer the base of the wing than the prolongation of the arculus would be; two (right) three (left) posttriangular cells, then two rows increasing; sectors of the triangle distinctly separated at origin by .2-.25 mm. interval; 12 (right)-13 (left) marginal cells between the short sector and the first sector of the triangle; no hypertrigonals. Membranule cinereous, only the extreme base, for about .25 mm. in length, white. A very slight, pale yellowish tinge at the base of the wings, most extended opposite the membranule where, however, it does not reach outward as far as one cell.

♀ (type). Vertex more brownish, occiput brown above. Colors of the prothorax and of the sides and ventral surface of the thorax paler, luteous. Pale olive stripe on inner side of the black antehumeral one not apparent. Metepimeric yellow stripe not marked off along its posterior margin from the color of the metepimeron itself. Feet luteous, blackish at knees and on inferior surfaces of tibiæ and tarsi; third tibiæ with 9 anterior (external), 13 posterior (internal) spines. Shape of the abdomen similar to that of the ♂, but the differences between the widths of the different segments less marked; color luteous with mid-dorsal and lateral carinæ black, and with pruinoseness apparent on most of the segments; lateral margins of 8 distinctly produced.

Appendages (right one wanting) longer than 10, not as long as 9, simple, cylindrical, luteous, apex black, pointed; anal tubercle about half as long, yellowish.

Vulvar lamina not produced, similar to that of *brachialis* as I have described it (Proc. U. S. Nat. Mus. xviii, p. 132.).

Wings: cross-veins between median sector and upper sector of arculus blackish. Pterostigma as in the left front wing of the ♂. Fewer double cells between subnodal and next supplementary sector and only one row in the left hind wing. Upper end of arculus between second and third antenodals. The single submedian cross-vein slightly farther from the base than is the level of the first antenodal.

Front wings with 13 (right) 15 (left) antenodals, 8 (right) 9 (left) postnodals; 12 (right) 11 (left) marginal cells between the short sector and the first sector of the triangle; hypertrigonal wanting on the left front wing.

Hind wings: 10 antenodals; 10 postnodals; basal side of the triangle in the prolongation of the arculus; two posttriangular rows from the triangle outward, increasing; sectors of triangle arising from the same point; 14 (right) 12 (left) marginal cells between the short sector and the first sector of the triangle. White at base of membranule twice as great in extent. The yellowish tinge at the base of the wings somewhat deeper and in the submedian space reaching half as far as the level of the first antenodal.

Total length ♂ 43, ♀ 45. Abdomen ♂ 29.5, ♀ 32. Sup. app. ♂ 1.75. App. ♀ 1.3. Third tibia 5-5.5. Front wing ♂ 31, ♀ 34. Hind wing ♂ 30, ♀ 33. Pter. ♂ 3.5, ♀ 3.75. Width of abdomen at base of 3: 3, at base of 4: ♂ 1.3 ♀ 2, at apex of 5: ♂ 2.3, ♀ 2.5, at 10: ♂ 1.5, ♀ 1.75.

53. **Libellula polysticta** B. P. 856. [*Neurocordulia obsoleta* Say.]

Von New-Orleans, in v. Winthem's Sammlung.

One male in the M. C. Z. with the pin-labels "Winthem" printed, "L. polysticta Burm. New Orleans" (written).

In Psyche, v, p. 371, 1890, Hagen wrote "the type of Burmeister a male . . . . . in my collection . . . . The type of Burmeister is immature and in bad condition". He mentions it also in Proc. Bost. Soc. Nat. Hist. xv, p. 269, 1873.

54. **Libellula vesiculosa** Fab. P. 857. [*Lepthemis.*]

♂ ♀. **Aus Westindien und Brasilien, in Sommer's, v. Winthem's und der Hallenser Sammlung.**

One male under the green drawer-label "vesiculosa Fabr. St. Thomas" in B.'s hand, at Halle; no pin-label. One female in the M. C. Z. with the pin-labels "Winthem" (printed), "vesiculosa? fab. * Bahia" (written).

55. **Libellula hæmatogastra** B. P. 857. [*Lepthemis.*]

♂. **Aus Surinam, in Sommer's Sammlung.**

I have not seen the type which (one individual) is in the Hofmuseum at Vienna (Prof. Brauer).

56. **Libellula frontalis** B. P. 857. [*Scapanea.*]

♂. **Von St. Domingo, in Sommer's Sammlung.**

I have not seen the type which (one individual) is in the Hofmuseum at Vienna (Prof. Brauer).

Hagen says (Proc. Bost. Soc. Nat. Hist. xv, p. 375, 1873) of *frontalis*, "At the time I published my Synopsis I had seen only the type of Burmeister."

(No number.) **Libellula sabina** Drury. P. 857. [*Orthetrum sabina et O. contractum.*]

Following the sentence last quoted from B. is this one:

Eine ähnliche [to L. frontalis Burm.] aber geringere Erweiterung der drei vorletzten Hinterleibsringe zeigt die hieher gehörige verwandte L. Sabina (Drury, exot. Ins. I. pl. 48, f. 4). Sie findet sich in China (v. Winthem's Sammlung), und nach Exemplaren in Sommer's Sammlung auch auf der Comorischen Insel St. Johanna.

One male in the M. C. Z. with the pin-labels "Winthem" (printed), "L. sabina Drury I pl. 48. f. 4" (written), and "L. sabina Drur. L. gibba F. L. leptura Burm. *" (in Hagen's hand) is the true *Sabina*.

One teneral male (♂) under the blue drawer-label "Sabina Drury Ins. Com. Smr." in B.'s hand, at Halle, with white pin-label "62", is of a different species, to which also belong two males in the K. K. Hofmuseum at Vienna, one having the pin-label "L. sabina Burm. Johanna. p. 857 no: 56 nota" in Hagen's hand, the other the pin-label "Johanna" in an unknown hand; both of these Vienna males

have an additional pin-label "Collect. Somer 1870", and both were placed at the drawer-label "stemmalis Burm." (in Dr. Brauer's hand) when I saw them. The following description is compiled from notes made from the types at Halle and at Vienna; their proper specific name is, I believe, *contractum* Rambur, of which also I have studied the type (see the index, *post*) at Oxford.

♂ (types of Burmeister). Vertex brown or dark bluish, frons luteous or olive becoming bluish above, clypeus luteous or pale greenish, lips yellowish, median labial lobe brown or black.

Thorax luteous with brown, ill-defined stripes as follows: a short antehumeral not reaching the base of the front wing, a humeral, one at the (obsolete) first lateral suture, one on the second lateral suture: latero-ventral metathoracic carina or a stripe thereon brown, as is a stripe on the mid-dorsal carina in the Halle type.

Legs luteous, knees brown, or blackish with the first femora yellowish inferiorly. Third tibiæ with 7-9 exterior (anterior), 11-13 interior (posterior) spines.

Abdomen luteous, the carinæ and transverse bands at the bases and apices of the segments brown, which on 5 and 6 reduce the luteous to the middle third of the segment and on 7-10 cause its almost entire disappearance (Halle type); or pruinose above, luteous below, with black at the intersegmental articulations having one-third the extent of the luteous of each respective segment (Vienna type).

Appendages of the usual form, very pale yellow, the denticles alone black, tips of the superiors broken off; or blackish except at the tip.

Genitalia of the second abdominal segment essentially similar to the figure I have given for *capensis* (Proc. U. S. Nat. Mus. xvi, p. 584, f. 3, 1893).

Wings: reticulation uniformly brown in the teneral Halle type, blackish-brown throughout in the (older) Vienna males. Pterostigma yellowish, or dark brown. Membranule dark brown, slightly whitish at base. Arculus a little more remote than the second antenodal. But one row of cells between the subnodal sector and the supplementary sector next below.

Front wings: 13-15 antenodals, 10-12 postnodals, one hypertrigonal (2 on left side of Halle ♂), internal triangle 3-celled, discoidal triangle with one cross-vein, three posttriangular rows.

Hind wings: 11-13 antenodals, 11-12 postnodals, no hypertrigonals, triangle free, no internal triangle, two posttriangular rows increasing, sectors of the triangle almost united, or very slightly separated at origins.

Total length 42 mm., abdomen 29 (these two measurements are from the Vienna type, as abdominal segments 7-9 are shrunken in that at Halle). Hind wing 31.5-32. Pterostigma 3.5-3.

In the foregoing description wherever alternative statements indicated by the word "or" are made, the statement before the "or" applies to the Halle type, that after the "or" to the Vienna type. The latter is evidently an older individual.

57. **Libellula stemmalis** B. P. 857. [*Orthetrum.*]

testacea fusco-vittata, fascia frontis media nigra; abdomine fusco, segmentis 1-6 fascia lata testacea; alæ hyalinæ, venis stigmatibusque nigris. Long. 1¾".

Von Isle de France, in v. Winthem's Sammlung.

One male in the M. C. Z. with the pin-labels "Winthem" (printed), "L. stemmalis * Burm. Isle de France" (written). A description follows:

♂ (type). Vertex blackish in front, olive behind, tip distinctly bifid, apices acute. Anterior surface of the frons above the horizontal carina blackish, becoming brownish on the sides, and uniting with a narrow black stripe in front of the vertex and antennæ, leaving a yellow spot on the superior surface of the frons surrounded by the black; below the horizontal carina the frons is pale olive, as is the nasus; rhinarium darker. Lips yellow, labrum with its free margin edged with black and a small triangular blackish spot at the middle of the basal margin which reaches half-way towards the free margin; middle lobe and the inner (mesal) margins of the lateral lobes of the labium black. Occiput yellow behind, obscurer above. Rear of eyes dark brown above (enclosing two yellow spots), yellow below.

Anterior and middle prothoracic lobes dark brown, their anterior margins and a median, basal, dorsal spot yellow. Posterior lobe of almost equal width with the middle lobe, yellow, hind margin entire.

Thorax greenish-luteous with the following dark brown markings: two antehumeral stripes which do not, and a humeral stripe which does, reach the wing base above, a narrow (metepisternal) stripe at the spiracle and a broader (mesepimeral) one in front of it, these two ill-defined, especially in their upper halves, a stripe on the second lateral suture and an ill-defined one (metepimeral) parallel to and behind it. The free greenish-luteous area on the thoracic dorsum between the first antehumeral stripes of each side measures 3 mm. in width; the second antehumeral stripe is united below with the humeral, and both antehumerals, the humeral and the mesepimeral are connected at their lower ends, as also the first antehumeral at its lower end with dark brown on the anterior mesothoracic border. Latero-ventral metathoracic carina black.

Feet luteous, apices of all the femora, inferior surfaces of the second and third femora, inferior surfaces of all and superior surfaces of third tibiæ, tarsi, blackish. Hind tibiæ with outer (anterior) row of 7 spines, inner (posterior) row of 11-12 spines.

Predominant color of abdominal segments 1-3 ochre, 1 and base of 2 with black on each side of dorsum (enclosing an elliptical ochreous spot) and continued as a lateral brown band on each side of 2 and 3; carinæ of 2 and 3 with black stripes and apex of 3 black; 4-10 predominantly black, 4 with a small ochreous spot each side at base, 4-6 with a median ochreous spot each side of dorsum, 4-9 with a ventral ochreous spot occupying the middle of the segments.

Viewed from above the abdomen (whose shape seems well preserved) is widest at 2 (3 mm.), narrowest at base of 4 (1.25 mm.), widens to apex of 6 (2.6 mm.), narrows to 10 (1.6 mm.); the base is strongly compressed.

Superior appendages as long as 9, luteous, brownish at base, apex and ventral surface of the usual form in *Orthetrum*, with seven denticles below. Inferior

appendage one-fifth shorter, reaching backward as far as the last denticle of the superiors, luteous with blackish margins, of the usual form, apex ending in two upturned denticles.

Genitalia of 2. Anterior lamina more prominent than the other pieces; viewed in profile its anterior surface shows a small hump near the middle; apex emarginate. Hamule bifid in its apical half, anterior branch terminating in a sharp slender point which is bent nearly at right angles and directed outwards (laterad); posterior branch wider (about twice when viewed in profile), of nearly equal length, its apex rounded, not hooked. Genital lobe projecting to the same distance as the anterior hamular branch, its width equal to its length when viewed in profile (Pl. I, fig. 12).

Wings hyaline, uncolored, except for the faintest trace of pale yellow on hind wings alongside of membranule and reaching out about one cell. Reticulation blackish except the costa, which is yellowish. Pterostigma ochre, surmounting two and parts of two other cells. Membranule cinereous except at the base, where it is for a small area whitish.

Front wings: 16 (right, 15 (left) antecubitals, last continuous, 13 (right) 11 (left) postcubitals, one hypertrigonal, triangle with one cross-vein, internal triangle of 4 (right) 3 (left) cells, three rows of posttriangular cells to the level of the nodus, one submedian cross-vein slightly farther than the level of the first antecubital.

Hind wings: 11 (right) 12 (left) antecubitals, 11 (right) 12 (left) postcubitals, no hypertrigonals, triangle free, its inner side in prolongation of the arculus, no internal triangle, two rows of posttriangular cells between the short sector and first sector of the triangle to not quite as far as the level of the origin of the median sector, sectors of the triangle slightly separated at origin, one submedian cross-vein slightly nearer than the level of the first antecubital.

All wings: Arculus slightly beyond the second antecubital, next supplementary sector below the subnodal separated from it by two rows of cells at its greatest distance, "loop nervure" below the short sector separated from it by one row of cells.

Total length 50 mm. Abdomen 34. Front wing 36.5. Hind wing 34.5. Pterostigma: front wing 3.6, hind wing 4.; hind tibia 6.

I have tabulated the characters separating *stemmalis* and *Wrightii* Selys, which is but a race, in Proc. Acad. Nat. Sci. Phila., 1898, p. 145.

58. **Libellula chrysostigma** B. P. 857. [*Orthetrum.*]

testacea, fusco-variegata; costa alarum hyalinarum nec non venis transversis inter subcostam et radium albidis; stigmatibus fulvis nigro-marginatis.

♂. corpore pruinoso, abdomine toto fusco.

♀. vitta dorsali thoracis flava, segmentis abdominalibus in medio testaceis.

Von Teneriffa, in v. Winthem's Sammlung.

Two *males* in the M. C. Z. are thus labeled—One, the male of the above description, with the black abdomen pruinose at base, has the written pin-label "L. auristigma Br. (in copula captæ) * Teneriffa"; the other and younger male, the female of the description, has the

pin-label "L. auristigma * Br. Teneriffa" in Hagen's handwriting; both have the printed label "Winthem". These two males are apparently of the same species and their description follows. Under the column "Old ♂" only the *differences* from the younger ♂ are noted.

(Younger ♂)	(Old ♂)
Vertex, lips and face luteous, inclining to greenish above. Vertex distinctly bifid, tips acute.	Dark olive on the greater part of the frons, labrum yellow unspotted.
Occiput and rear of the head luteous, the former darker.	
Anterior and middle lobes of prothorax brown, their anterior margins and a middle dorsal spot yellow. Posterior lobe of equal width with the middle lobe, luteous, its hind margin entire.	
Thorax greenish-luteous with the following dark brown stripes: two antehumeral, a humeral, a mesepimeral, and a metepisternal (at the spiracle). The two antehumerals unite above, the second also with the humeral below. Between the humeral and the mesepimeral is a cream-colored stripe which, like the dark brown stripes, becomes less defined above. Latero-ventral metathoracic carina black.	All these somewhat obscured and partly covered with pruinose.
Legs luteous, apices of all the femora and inferior surfaces of the second and third, third tibiæ and inferior surfaces of first and second, tarsi, blackish. Hind tibia with 8 (outer) 12 (inner row) spines.	6 (outer) 12 (inner).
Abdomen viewed from above widest at 2 (2.6 mm.), narrowest at base of 4 (1.3 mm.) widening to apex of 6 (2 mm.), narrowing to 10 (1.5 mm.); strongly compressed at base. Luteous, carinæ, articulations, lateral margins of 4-9, 10 almost entirely, black. Slight pruinoseness on 3.	3 mm. 1.8 mm. 2.4 mm., 1.5 mm. pruinose on 1-3, black on 4-10 dorsally.
Superior appendages as long as 9, blackish, of the shape usual in *Orthetrum*, with a row of 7 denticles below. Inferior appendage ¼ shorter, luteous with black margins, reaching to the last denticle of the superiors, shaped as usual.	7-9 denticles. ¼ shorter.
Genitalia of 2 difficult to examine. Anterior lamina slightly more prominent than the other pieces, its anterior surface, viewed in profile, slightly and regularly convex; tip emarginate. Hamule bifid at apex, branches subequal in length, anterior branch without any hook at tip, straight, blunt; posterior branch about three times thicker (seen in profile), tip rounded. Genital lobe projecting equally with the anterior hamular branch, subquadrate (viewed in profile), antero-posterior dimension greater than dorso-ventral. (Pl. I, fig. 11).	Penis partly projecting, parts as described, as far as visible.

Wings hyaline, uncolored save for a pale yellow spot in the submedian space of the hind wings from base half way to cross-vein. Pterostigma yellow surmounting one cell and parts of two others (except in one hind wing. Membranule cinereous, whitish at extreme base. Reticulation blackish; costa, antenodals in the subcostal space, cross-veins between median nerve and median sector out to the level of the nodus, and submedian cross-veins whitish.

Front wings: Antenodals 12, last continuous, 8 postnodals. One hypertrigonal (lacking on the left), triangle with one cross-vein (free on the left), internal triangle two-celled (right) free (left), two rows of posttriangular cells to the level of the origin of the median sector, 9-10 marginal cells between short sector and first sector of triangle. One submedian cross-vein, slightly beyond the level of first antenodal (an additional one, more remote, on right wing).

11 (right) 14 (left) antenodals, 7 postnodals, one hypertrigonal (both sides) triangle crossed (both sides), internal triangle of three cells (both sides), three posttriangular rows.

Hind wings: 9 antenodals, 9 (right) 8 (left) postnodals, no hypertrigonals (one in right wing), triangle free its inner side in prolongation of the arculus, two posttriangular rows between short sector and first sector of triangle to the level of separation of median sector, one submedian cross-vein, nearer the base than is the level of first antenodal (an additional one on right wing, more remote), both sectors of the triangle arising from the hind angle thereof.

10 antenodals, 7 postnodals, no hypertrigonals.

Sectors of the triangle slightly separated at origin.

All wings: Arculus at the second antenodal. Supplementary sector next below the subnodal at no point separated from it by more than one row of cells.

Separated from it by two cells, where the distance is greatest.

	Young ♂	Old ♂
Total length	46 mm.	47
Abdomen	32	32
Front wing	32	34.5

	Young ♂	Old ♂
Hind wing	31 mm.	33
Pterostigma front wings	3.2	3 7
hind wings	3.2	4.
Hind tibia	5.5	6.

59. **Libellula leptura** M[useum] B[erolinense]. B. P. 858. [*Orthetrum sabina* Drury.]

♂ et ♀. **Aus Java, vom Herrn Grafen v. Hoffmannsegg.**

One male (T), one female (T) under the yellow drawer-label "leptura M. B. Java Hoffingg." in B.'s hand, at Halle; the male without pin-label, the female with the pink pin-label "14". See also under *Libellula sabina*, *ante*, p. 82.

60. **Libellula sanguinea** B. P. 858. [*Urothemis.*]

corpore sanguineo, subtus cum ore testaceo; alarum venis basalibus costaque sanguineis, stigmatibus flavis nigro marginatis; alæ posticæ macula basali nigra, fulvo-limbata et venosa. Long. 1¼". ♂. et ♀

Von Madras, durch Hrn. King; der Lib. ferruginea Fabr. zwar ähnlich aber gewiss verschieden.

Two males, one (♂) without, the other with pink pin label "19", under the yellow drawer-label "sanguinea * Madras King" in B.'s hand, at Halle. Only the former male is a type and has

(♂ type) front wings at base yellowish-brown half-way to submedian cross-vein. Hind wings with a blackish-brown basal streak in subcostal space and half of costal space to first antenodal, a similar streak in the submedian space almost to the triangle; in the postcostal space a black spot, veined with red, which does not touch the postcostal vein nor the anal margin by a single cell, but reaches out to the level of the triangle and is bordered by a yellowish cloud, which yellow also fills the median space.

The other male, which I did not consider a type, has the yellow on the front wings less extended. On the hind wings, in the costal and subcostal spaces, is a yellow-brown spot reaching but a third of the way to the first antenodal; a yellow-brown spot at the base, from the submedian vein half way to the hind margin of the wing, reaching out to the level of the submedian cross-vein, bordered with a yellow cloud, veined with yellow, the central parts of the cells clearer.

61. **Libellula semiaquea** B. P. 858. [*Tetragoneuria.*]

♀. **Von Savannah, in v. Winthem's Sammlung.**

One female in the M. C. Z. with the pin-labels "Winthem" (printed), "semiaquea Br. Savannah" (written). The following notes were made from it.

♀ (type). No T-spot or other black spot on the frons. Front wings unspotted. Hind wings with brown extending along the costal margin from base to nodus, thence obliquely towards the anal angle, the outer margin of the brown being very irregular as the central parts of the cells there are clear; the median, submedian and hypertrigonal spaces, the areas between the sectors of the arculus and above the upper sector of the arculus out to the level of the apex (distal angle) of the triangle are clear.

62. **Libellula ferruginea** Fabr. P. 858. [*Crocothemis erythræa.*]

♂. et ♀. **das Hallenser Mus. erhielt diese Art vom Herrn Grafen v. Hoffmannsegg aus Java.**

One male under the yellow drawer-label "ferruginea Fabr. Donov. Beng. Java." in B.'s hand, at Halle; no pin labels.

63. **Libellula pruinosa** (Hagenb.) B. P. 858. [*Orthetrum.*]

♂. et ♀. **Von Java, unter diesem Namen vom Herrn Grafen von Hoffmannsegg;**

Two males (♂) under the yellow drawer-label "pruinosa Hag. Java Hoffm." in B.'s hand, at Halle; one with a pink pin-label "20", the other without. I compared them with the description of *Libella pruinosa* by de Selys (Ann. Mus. Civ. Stor. Nat. Genova xxvii, p. 463, 1889), and found them to agree therewith.

64. **Libellula testacea** B. P. 859. [*Orthetrum.*]

fulvo-testacea, alis in basi fulvis; venis stigmatibusque nigris. Long. 1″ 10‴. ♂

Von Java, in v. Winthem's Sammlung;

One male in the M. C. Z. with the pin-labels "Winthem" (printed), "L. testacea * Burm. Java" (written, but without border). Although B.'s description quoted has "venis stigmatibusque nigris", this male has the costa as far as the pterostigma and most of the antenodals in both costal and subcostal spaces yellowish; pterostigma ochre-brown. The yellow at the base of the front wings extends out to a little farther than the level of the first postcostal cell, on the hind wings to the first antenodal and the distal subbasal sector (Kirby). In other respects it agrees with de Selys' brief description (*l. c.* p. 463, 1889).

65. **Libellula Aurora** B. P. 859. [*Trithemis.*]

rufo-fulva, alis omnibus in basi fulvis, venis sanguineis, stigmatibus minoribus fuscis. Long. 1½″. ♂.

Von Manilla, in v. Winthem's Sammlung. Hat ganz die Statur der vorigen Art, ist jedoch viel kleiner und röthlicher.

Two males in the M. C. Z. One with the pin-labels "Winthem" (printed), "Aurora * Br. Manilla" (written, see fig. F, page 30), is referred to below as the "labeled type"; the other with merely the printed pin-label "Winthem" is the "unlabeled type". The following description is based on both.

♂ (types). Frons red in front, metallic violet above, nasus red, rhinarium and labrum olivaceous, the latter with a round black spot at the middle of its free margin, but not reaching to the base; labium luteous, middle lobe black, inner (mesal) margins of the lateral lobes narrowly edged with black; vertex, lost in the labeled type, metallic violet, tip slightly concave, occiput luteous, rear of eyes yellow with two black spots.

Prothorax reddish, hind lobe narrower than the others, semicircular, hind margin entire. Thorax and abdomen reddish, and pruinose in the labeled type, with black lines on the humeral and lateral thoracic sutures, a curved stripe on the pectus immediately in contact with the latero-ventral metathoracic carina, uniting with its fellow of the opposite side at its posterior end, its anterior end stopping at the third coxa; the pectus has therefore a black ring open only for a very short interval anteriorly.

Feet luteous or reddish; first femora superiorly, all of second and third femora, tibiæ inferiorly and tarsi black.

Abdomen widest at apex of 6 (3 mm.; at 2, 2 mm.; at 4, 2 mm.; at 10, 1.25 mm.), unspotted except for the articulation 9 10 and the sterna, which are black.

Superior appendages with their extreme tips acute, as long as 9, red, nearly straight viewed from above, viewed in profile arched in their basal half, nearly straight in their apical half, thicker in the third fourth, where there is a row of four denticles on the inferior surface. Inferior appendage reaching distinctly beyond these denticles, triangular, about one and two-thirds times as long as greatest width (at base).

Genitalia of 2: hamule and genital lobe equally prominent, anterior lamina less so, its margin entire. Hamule bifid at apex, inner branch the more slender, curved to form a hook directed backward, outer branch shorter, obtuse, rounded at tip. Genital lobe rather slender, about two and one-half times as long as wide, curved slightly forward, narrowed at the tip. (Pl. I, fig. 8).

Wings clear, reticulation red, pterostigma dark brown, surmounting one and parts of two other cells, membranule blackish. Arculus between first and second antenodals, or at the second on hind wings of the unlabeled type, its sectors stalked, separated throughout by one row of cells only. Nodal sector very slightly waved, separated from the subnodal by one row of cells except at the wing margins. Supplementary sector next below the subnodal separated from it (at the level of the middle postnodals) by two rows of cells, one submedian cross-vein nearer the base than is the first antenodal, no hypertrigonals.

Front wings with 15-13 antenodals, the last not continuous, 10-11 postnodals, triangle with one cross-vein, internal triangle of three cells, three rows of posttriangular cells to the wing margin (four cells immediately after the triangle on the right, then three rows in the labeled type). Brownish yellow at base reaching to the submedian cross-vein, or not quite so far (labeled type).

Hind wings: 10-9 antenodals, 13-11 postnodals, triangle free, its proximal side in prolongation of the arculus, no internal triangle, two rows (three, then two rows, left side of unlabeled type) of posttriangular cells increasing to 12-14 marginal cells, sectors of the triangle united (barely separated, left side of labeled type) at their origin. Brownish yellow at the base reaching to the first antenodal for the entire width of wing, but clearer in the median space (labeled type), to the second antenodal with the subcostal and submedian spaces darker brown (unlabeled type).

Total length 33-36 mm. Abdomen 23-24. Front wing 28-29. Hind wing 27. Pterostigma 2.25. Superior appendages 1.5.

66. **Libellula sanguinolenta** B. P. 859. [*Trithemis.*]

sanguineo-fulva, alis omnibus in basi fulvis, venis stigmatibusque latioribus sanguineis. Long. 1¼". ♂.

Vom Kap, in v. Winthem's Sammlung; gleicht sehr der Vorigen, ist indess durch die Breite und Farbe des Flügelmahles von ihr verschieden.

Two males in the M. C. Z. One has the pin-labels "Winthem" (printed), "Sanguinolenta * Br. Prom. bon. sp." (written), the other has merely the printed pin-label "Winthem"; they are referred to in the following description as the "labeled" and the "unlabeled" types respectively.

♂ (types). Almost entirely red; labrum along its free edge, labium, bases of the mandibles, occiput, rear of head and abdominal segments 1 3 inclining to luteous. A very slight blackish streak on the middle of the lateral carinæ of 3 6 or 8 (middle of mid-dorsal carina of 3 5 and 8-9 very slightly browned; trace of a small, median, apical, dorsal, darker spot on 9 in the labeled type only), sterna of 3-8 black.

Hind lobe of prothorax narrower than the other lobes, its shape that of a small segment of a circle, its hind margin with a slight median notch.

Superior appendages slightly longer than 9, red, subcylindrical, thickened before the acute apex, third fourth with an inferior row of seven black denticles. Inferior appendage one-eighth shorter, red, triangular, about twice as long as wide at base, reaching beyond the denticles of the superiors, its tip ending in the usual two upturned denticles.

Genitalia apparently not at all different from my description and figure of those of *Trithemis ferrugaria* Ramb. (Proc. U. S. Nat. Mus. xviii, p. 125, figs. 4, 5.)

Wings clear, reticulation reddish near the costal margin, becoming blackish posteriorly. Pterostigma reddish, surmounting one cell and parts of two others Membranule blackish.

Arculus between the first and second antenodals, its sectors stalked, nodal sector not waved, supplementary sector next below the subnodal separated from it by but one row of cells, no hypertrigonals.

Front wings with ten antenodals, the last not continuous, 7–8 postnodals, one submedian cross-vein, nearer the base than is the first antenodal except in one wing of one ♂, discoidal triangle with one cross-vein, internal triangle of three cells (two, right side of unlabeled type) three rows of posttriangular cells to the level of the origin of the subnodal sector, increasing to 9–11 marginal cells. Yellow at base extending to the submedian cross-vein.

Hind wings: 7–8 antenodals, 7–8 postnodals, two submedian cross-veins (except in the left hind wing of unlabeled type, where there is but one), discoidal triangle free, its inner side in prolongation of the arculus (or slightly more remote in one wing of one ♂), two rows of posttriangular cells for two to three cells, increasing to 9–10 marginal cells, sectors of the triangle united at origin. Yellow at base extending to the second antenodal and the arculus thence obliquely inwards (mesad) to the anal angle.

Total length 34 mm. Abdomen 22. Front wing 27.5. Hind wing 26. Pterostigma 3.

The drawer-label in Dr. Hagen's handwriting after which these two types are placed reads "L. sanguinolenta Burm. L. ferrugaria Ramb." From Rambur's description of his *ferrugaria* these two males differ not at all, nor can I find any difference of specific value in the specimens which I described as *ferrugaria* in Proc. U. S. Nat. Mus. xviii, p. 125.

67. **Libellula contaminata** Fab. P. 859. [*Brachythemis.*]

♂. **Von Madras, durch Hrn. King; in der Hallenser Sammlung.**

Two males under the yellow drawer-label "contaminata Fabr. Madras King" in B.'s hand, at Halle; no pin-labels.

One male in the M. C. Z. with the yellow pin-label "*coll. Germar* contaminata Fabr. Java Br. *Type Burm. II, 859.*", the words here printed in italics being in Hagen's hand. Hagen's copy of B. has no * for this species.

68. **Libellula zonata** B. P. 859. [*Pseudothemis.*]

♂. **Aus China, in Sommer's Sammlung.**

I have not seen the type which (a single specimen), Prof. Brauer writes, is in the Hofmuseum at Vienna.

69. **Libellula cœrulescens** Fab. P. 859. [*Orthetrum.*]

♂. ♀. **Im südlichen Deutschlande und Europa.**

One male under the white drawer-label "cœrulescens aut. Tyrol v. Klaas." in B.'s hand, at Halle; no pin-labels.

One male in the M. C. Z. with the pin-label "*Coll. Germar* cœrulescens Fbr. *Type Burm.*", the words here printed in italics being in Hagen's hand; his copy of B. has no * for this species.

70. **Libellula cancellata** Linn. Fab. P. 859. [*Orthetrum.*]

♂. ♀. **Lib. lineolata Charp. hor. entom. 44.**
In Europa überall, aber nicht sehr häufig.

One female under the white drawer-label "cancellata Fabr. Sund" in B.'s hand, at Halle; no pin-label. Under a separate label "lineolata Charp. Eur. austr." also in B.'s hand, at Halle, are two males, without pin-labels.

71. **Libellula conspurcata** Fab. P. 860. [*Libellula fulva* Müll.]

♂ ♀. **Gemein in ganz Europa.**

Two males, one female, under the white drawer-label "conspurcata Charp. ♂ & ♀" in B.'s hand, at Halle; no pin-labels.

72. **Libellula depressa** Linn. P. 860. [*Platetrum.*]

♂ ♀. **Ueberall in ganz Europa.**

Two males, two females, under the white drawer-label "depressa aut." in B.'s hand, at Halle; no pin labels.

73. **Libellula sexmaculata** Fab. P. 860. [*Palpopleura.*]

♀. **Aus China, in Sommer's Sammlung;**

I have not seen the type which (a single specimen) is in the Hofmuseum at Vienna (Prof. Brauer).

74. **Libellula marginata** Fab. P. 861. [*Palpopleura lucia* Drury.]

♂. **Vom Port natal, aus der Sendung des Herrn Drège.**

Two males under the blue drawer-label "marginata * Port. nat. Drg." in B.'s hand, at Halle; one without pin-label, the other with a bit of unmarked blue paper. Hagen's copy of B. has * — opposite this species, but there is no B. specimen in the M. C. Z.

75. **Libellula semivitrea** B. P. 861. [*Palpopleura.*]

Von der Comorischen Insel St. Johanna; in Sommer's Sammlung.

One teneral male under the blue drawer label "semivitrea * Ins. St. Johña" in B.'s hand, at Halle; with pink pin-label "68".

76. **Libellula luctuosa** B. P. 861. [*Libellula basalis* Say.]

♂ ♀. **Aus Pennsylvanien, in Sommer's Sammlung.**

I have not seen the two types which are in the Hofmuseum at Vienna (Prof. Brauer).

77. **Libellula auripennis** B. P. 861. [*Libellula.*]

Von Savannah, in v. Winthem's Sammlung.

One male in the M. C. Z. with the written pin-label "L. auripēnis Burm. * Savannah", and the printed pin-label "Winthem."

78. **Libellula trimaculata** de Geer. P. 861. [*Plathemis.*]

♂ ♀. **Aus Nord-Amerika, in v. Winthem's und der Hallenser Sammlung.**

Two males under the pink drawer-label "trimaculata aut. Am. bor. Zm." in B.'s hand, at Halle; no pin-labels.

One teneral male in the M. C. Z. with the written pin-label "Lydia Drury 3-maculata Fab. Savannah", and the printed pin label "Winthem".

See also under No. 81, *post.*

79. **Libellula quadrimaculata** Linn. P. 861. [*Libellula.*]

Nicht selten, in ganz Europa;

One male, two females, under the white drawer label "4 maculata Fabr. Sund." in B.'s hand, at Halle; no pin-labels.

80. **Libellula semifasciata** B. P. 862. [*Libellula.*]

♀. **Aus Nord-Amerika; von Zimmermann.**

One female (T) under the pink drawer-label "semifasciata * Am. bor. Zm." in B.'s hand, at Halle; no pin-label.

81. **Libellula bifasciata** de Geer. P. 862. [*L. pulchella* Drury.]

Eben daher, beide Geschlechter in der Hallenser Sammlung.

One male, one female, under the pink drawer-label "bifasciata aut. Am. bor. Zm." in B.'s hand, at Halle; no pin-labels.

In the M. C. Z. is a female with the written pin-label "bifasciata Fab. pulchella Drury Savannah" and the printed pin-label "Winthem"; it is, however, a female of *L. trimaculata* de Geer and, quite probably, B.'s type of *trimaculata*, but wrongly labeled by Winthem, or by whoever labeled Winthem's collection. This supposition finds support in the facts (1) that although B. quotes both sexes of *trimaculata* (see No. 78 *ante*) only *male* types are so labeled at Halle and in the M. C. Z.; (2) that B. cites only the Hallenser Sammlung for *bifasciata;* (3) that Hagen's copy of B. has no * opposite No. 81.

Supplemental Note on the Types at Vienna.

The hope expressed on page 34, *ante*, is realized by the following letter from Prof. Brauer, dated Vienna, July 15, 1898.

"In beantwortung Ihres Schreibens vom 2. Mai d. J. theile ich Ihnen mit, dass folgende Typen Burmeisters aus Sommers Sammlung im M. C. sich befinden:

Agrion	1. *lucretia*	3	Exemplare.
	4. *macrurum**	3	"
Aeschna	2. *quadriguttata**	1	"
	3. *costalis**	1	"
	4. *luteipennis**	1	"
	5. *reticulata**	1	"
	6. *gracilis**	2	"
Libellula	5. *tessellata**	1	"
	15. *rufinervis**	1	"
	24. *terminalis**	2	"
	25. *basalis**	1	"
	27. *chinensis*	1	"
	34. *pullata**	1	"
	43. *unimaculata*	2	"
	45. *fallax** ♀	1	"
	46. *subfasciata** ♂	1	"
	55. *hæmatogastra**	1	"
	56. *frontalis**	1	"
	68. *zonata**	1	"
	73. *sexmaculata*	1	"
	76. *luctuosa**	2	"

Von den von Ihnen verzeichneten fehlen:

Diastatomma	1. *clavata.*	Wir haben die Art, aber nicht aus Sommer's Collect.
	4. *campanulata*	fehlt i. M. C.
Aeschna	17. *dorsalis.*	
	19. *amazili.*	Wir haben die Art, aber nicht von Sommer.
	20. *papuensis*	" " " " "
Libellula	26. *carolina*	" " " " "

Nicht verzeichnet in Ihrem Briefe, aber am M. C. vorhanden sind *Aeschna luteipennis*, *Aeschna 4 guttata*, *Tramea chinensis* u. einige europaische Arten aus Sommer's Sammlung.

II. Collection not given. Von diesen 6 Arten† haben wir die Type von (*Brachyt.*) *Aeschna vernalis* allein."

(Signed) Brauer.

I desire to here express my thanks to Prof. Brauer for his kindness.

† These are those referred to under (*b*) on page 35, *ante*. To Prof. Brauer's list of B.'s types in Vienna from Sommer's collection must be added the two males of *Lib. sabina* mentioned on page 82, *ante*.—P. P. C.

Types which have not been found.

As a result of Prof. Brauer's letter, it is now possible to say that of the 171 species described by Burmeister, the present locations of his types of the following 11 are unknown to me:

Calopteryx 3. *Titia*
Diastatomma 1 *clavata*
3. *tricolora*
4. *campanulata**
Aeschna 1. *lunulata*
Aeschna 17. *dorsalis**
19. *Amazili**
20. *papuensis**
Libellula 26. *carolina*
32. *fulvia*.
Libellula 37. *fasciata*.

As before, the asterisk (*) indicates the new species.

Appendix on certain African species of Orthetrum.

As the researches embodied in this paper originated in an attempt to identify certain species of *Orthetrum* described by the older authors, it seems not inappropriate to bring together here the notes made upon some types of Rambur, Palisot de Beauvois, de Selys and Brauer, and to correlate their species with those described by Burmeister and by myself. It is one thing to determine whether two nominal species are practically identical or not; it is another to ascertain if two seemingly different forms are really but extremes of a variable series. I shall here attempt the former only. The latter requires careful study of a large number of individuals, and only those who have examined such a series, as that in the Museum für Naturkünde at Berlin, can appreciate the extreme difficulty of defining the African species of *Orthetrum*.

Tentative Key to some African species of Orthetrum.

♀ I. Front wings with three rows of posttriangular cells (two rows in one type of *chrysostigma*, see page 85).

A. Hind wings of both sexes with at least a slight yellowish basal cloud; membranule blackish, whitish at the extreme base (except in *Abbotti*, where it is grayish-white throughout). Abdomen vesiculose at base, contracted at 3, at least in the males. Arculus at the second antenodal or more remote.

Costa sometimes yellowish, but the reticulation otherwise dark brown or black. No pale yellow stripes on the sides of the thorax.

Frons uniformly colored above ..... 1. **contractum** Rambur.

Frons above with a pale spot, which is surrounded by black.

2. **stemmale** Burm. and race *Wrightii* Selys.

Costa and antenodals in the subcostal space, at least, yellow.

No pale yellow stripes on the sides of the thorax.

3. **brachiale** Beauvois.

One or more pale yellow stripes on the sides of the thorax.

Sides of thorax with one pale stripe, which is on the mesepimeron; male with the internal hamular branch not hooked at tip, inferior appendage reaching to the last denticle of the superiors. Front wings with hypertrigonals.....4. **chrysostigma** Burm.

Sides of thorax with two pale stripes, one on the mesepimeron, one on the metepimeron; male with the internal hamular branch distinctly hooked at tip, inferior appendage not reaching to the last denticle of the superiors. Front wings with hypertrigonals.
5. **caffrum** Burm.

Sides of thorax with a pale stripe on the metepisternum and the entire metepimeron pale green: male with the internal hamular branch not hooked at tip, inferior appendage not reaching as far as the last denticle of the superiors, anterior lamina with a denticulated tubercle on its anterior surface. Front wings with hypertrigonals.
6. **Abbotti** Calvert.

Sides of thorax pruinose in types, younger colors unknown; males with the internal hamular branch prolonged into a horn-like apex bent a little backwards. No hypertrigonals..7. **farinosum** Förster.

B. Hind wings of both sexes uncolored, membranule black.

Costa exteriorly and the antenodals yellow; abdomen vesiculose at base, contracted at 3, in both sexes.....8. **trinacria** Selys.

C. Hind wings in the males at least uncolored, membranule grayish-white. Abdomen but little, or not at all, contracted at 3.

Arculus at the second antenodal, frons not more prominent than in the other species, pterostigma rhomboidal, male with the hamule more prominent than the other genitalia, its external branch longer than the internal; wings uncolored (♂) or yellowish at the base (♀), neuration black including the costa.....9. **azureum** Rambur.

Arculus between the first and second antenodals, frons more prominent than in other species, pterostigma trapezoidal, male with the genital lobe more prominent than the other genitalia, external hamular branch shorter than the internal; wings uncolored (♂), neuration blackish except the costa, which is yellow; ♀ unknown.
10. **Ramsonneti** Brauer.

½ II. Front wings with four rows of posttriangular cells.

Abdomen not vesiculose at base, costa externally and some antenodals yellowish. Pterostigma very long (6 mm.).....11. **leoninum** Karsch.

1. **Orthetrum contractum** Rambur.

Libellula c. Ramb., Névr. p. 60, 1842.—Mauritius, Madagascar.

Synonyms: *Lib. coarctata* Ramb. *l. c.* p. 61—Mauritius.

Lib. subina (not Drury) Burm. Hdb. ii, p. 857, 1839—from Comoro Is. only; see page 82, *ante*.

Orthetrum brachiale (not Beauvois) Calvert, Trans. Am. Ent. Soc. xix, p. 162, 1892; Proc. U. S. Nat. Mus. xviii, p. 130, 1895 (1896).—Kilima Njaro.

Förster, Ent. Nach. xxiv, p. 169, 1898.—Transvaal.

Orthet. capensis Calvert, Proc. U. S. Nat. Mus. xvi, p. 584, 1893.—Cape Town.

Contracta and *coarctata* were described by Rambur from the collection of Marchal, now in the Hope Collection, University Museum, Oxford, England. The type of *contractum* is a male from Maurice, marked "la tete est fausse", which is correct, as the head is not that of an *Orthetrum*. On the reverse side of the label is written "Libellula brachialis Maurice" and some words in French that I could not decipher.† The following notes were made Sept. 3, 1896:

Rambur's type of *Lib. contracta* at Oxford [only] differs from my description of *brachialis* [Proc. U. S. Nat. Mus. *l. c.*] in having the anterior lamina more prominent than any other part.

The costal vein like all others, including the antenodals, is blackish. The coloring at the base of hind wings is restricted to the merest trace of brownish-yellow in the submedian space and alongside the base of the membranule, but it does not reach as far as one cell in the area below the postcostal vein. Two rows of cells between the subnodal sector and the next supplementary sector below—at the level of half-way between nodus and pterostigma. Sectors of the triangle united at origin. Arculus of all wings beyond the second antenodal.

Abdomen 31.5 mm., front wing 35, hind wing (not entire), pterostigma 3.75.

This is surely the same species as that which I have described as *brachialis* Beauv.

The type of *coarctata* is a female from Ile-de-France; the last six abdominal segments are wanting. These notes were also made Sept. 3, 1896:

Rambur's type of *Lib. coarctata* at Oxford differs from my description of *brachialis* ♀ [Proc. U. S. Nat. Mus. l. c.] in that the light colors of the abdomen are yellow rather than brown.

Pterostigma luteous, membranule cinereous; reticulation, including costa and cross-veins, blackish. Sectors of the triangle of the hind wings united at origin. Two rows of cells between the subnodal sector and the next supplementary sector below. Arculus of all wings beyond the second antenodal.

Front wing 38 mm., hind wing 36.5, pterostigma 4.5.

2. **Orthetrum stemmale** Burmeister.

Libel s. Burm. Hdb. ii, p. 857, 1839.—Mauritius. See page 82, *ante*, for description of the type, and Proc. Acad. Nat. Sciences, Philadelphia, 1898, p. 145, for the trifling differences between it and *O. Wrightii* Selys, of the Seychelles.

3. **Orthetrum brachiale** Beauvois.

Libellula b. Beauv. Ins. recueil. Afr. Amer. p. 171, Neur. pl. 2, fig. 3, 1805. Rambur, Ins. Névr. p. 62, 1842. Selys, Ann. Soc. Ent. Belg. xxxi, p. 21, 1887. *Not* of Calvert 1892, 1895, nor Förster, 1898.

† I studied the types of Rambur, at Oxford, on July 10, 1895, and Sept. 3, 1896. On my first visit, there was no guide to their typical character other than the peculiar style of label bearing the name of the locality and a blue-line border measuring 7 x 9½ mm. On my second visit, I found these marked with a specially printed label indicating them as types. See Ent. News vii, p. 66 foot-note, March, 1896, and Ninth Annual Report of the Delegates of the University Museum [Oxford] (for 1896), page 34.

The types of Beauvois are in the collection of Baron de Selys-Longchamps at Liége, Belgium, and have furnished the three descriptions just quoted. They comprise three males and one female and are labeled as follows: the notation (1), (2), (3), (*a*), (*b*), (*c*), (*d*), is for the present purpose only.

♂ type (1) has the four pin-labels (*a*) "Oshna Bauv" in faded black ink; (*b*) "l'Afrique" in red ink, this is Serville's label; (*c*) "L. brachialis" in faded black ink; (*d*) a bit of unmarked paper, gold on one side, white on the other.

♂ type (2) has pin-labels as above except that (*c*) is a blue label with "L. brachialis Beauv. ♂ à renvoyer" in de Sely's hand; abdominal segments 8–10 are lacking.

♂ type (3) lacks label (*a*), but is otherwise as in (1).

♀ type has labels as in ♂ type (1).

The four types have the costa as far as the pterostigma, the cross-veins in the costal and the subcostal spaces, and those between the median sector and the upper sector of the arculus—yellow; two rows of cells between the subnodal sector and the supplementary sector next below. Male types (1) and (3) have the sectors of the triangle of the hind wings arising from the same point, while ♂ type (2) and the ♀ type have them slightly separated at origin. The genital lobe is a little more prominent than the anterior lamina or the hamule in ♂ types (1) and (3), while in ♂ type (2) the anterior lamina is more prominent than the hamule or the genital lobe.† Pterostigma ochre-brown, 3.5 mm. long, in the males, paler yellow in the female.

Otherwise agreeing with my description of *brachiale* in Proc. U. S. Nat. Mus. xviii, p. 130.

Thanks to the kindness of Baron de Selys-Longchamps, I made the foregoing notes at Liége, in August, 1896.

4. **Orthetrum chrysostigma** Burmeister.

Libellula c. Burm. Hdb. ii, p. 857, 1839; see page 85. *ante.*—Teneriffe.

O. c. McLachlan, Journ. Linn. Soc. xvi, p. 177. 1882. *L. c.* Selys, Ann. Soc. Ent. Belg. xxxi, p. 18, 1887.

Synonym? *Lib. barbara* Selys, Explor. Sci. Alger. Zool. iii, p. 117, pl. 1, figs. 2, 2*a*-*h*, 1849; Rev. Odon. p. 306, 1850.—Algeria.

Baron de Selys (*l. c.* 1887) considers *barbara* a synonym of *chrysostigma*. I saw the type of *barbara* in August, 1896, therefore previous to my study of the types of *chrysostigma*. Recently, in reading the descriptions of *barbara* (*l. c.*), I noticed this clause in the description of the thorax: "l'on voit l'apparence d'une seconde raie pâle des secondes ailes aux troisiémes pattes", an expression which applies better to the description of *caffra* (page 79, *ante*)

† It is such differences as this which have caused me to recede, to a certain extent, from the opinion expressed in Proc. U. S. Nat. Mus. xviii, p. 130, that "the most reliable specific characters are to be found in the genitalia of the male and the vulvar lamina of the female."

than to that of *chrysostigma* (page 85, *ante*). A further agreement with *caffra* and difference from *chrysostigma* is contained in M. Albarda's description (Selys 1887, *l. c.* p. 20) of the internal hamular branch of *barbara* as "munie d'un crochet noir-luisant dont la pointe est tournée en arrière". I am unable, however, to decide the question thus raised. The notes which I made in August, 1896, are as follows:

Selys' type of *Lib. barbara*, with label in his handwriting "L. barbara Selys ♂ *type* Alger à renvoyer", has pterostigma yellow, cross-veins in costal and subcostal spaces and between the median sector and the upper sector of the arculus yellow. Two rows of cells between the subnodal sector and the next following supplementary sector, except in the right hind wing. Sectors of the triangle of the hind wings a little separated at origin. Penis projecting so that the hamule is not easily seen, but considerable variation in the form of the hamule exists in the specimens in S. coll. from Tangiers and Damara and the differences from the form of *brachialis* [Calv.=*contracta* Ramb.] do not seem to be great enough to be specific.

I am unable to correlate the figures of the genitalia of *chrysostigma* Karsch, Berl. Ent. Zeit. xxxix, p. 15, 1894, with that I give here, Pl. I, fig. 11, from Burmeister's type.

5. **Orthetrum caffrum** Burmeister.

Libellula c. Burm. Hdb. ii, p. 856, 1839; see page 79, *ante*.—Natal.

Synonyms: *Lib. fasciolata* Rambur, Ins. Névr. p. 69, 1842.—Cape of Good Hope.

? *Lib. subfasciolata* Brauer, Verhdl. z. b. Gesell. Wien, xv, p. 506, 1865; Reise d. Novara, Neur. p. 97, 1866.—Cape of Good Hope.

Orthet. truncatum Calvert, Trans. Am. Ent. Soc. xix, p. 162, 1892; Proc. U. S. Nat. Mus. xviii, p. 128, 1895 (1896).—Kilima Njaro.

? *Lib. barbara* Selys. See under *chrysostigma* above.

The referring of *fasciolata* to *caffra* is on the authority of Baron de Selys (Ann. Mus. Civ. Stor. Nat. Genova, xvi, p. 222, 1881) who remarks "I tipi di Burmeister erano di Porto Natal, raccolti da Drégé. Quelli di Rambur, il quale non ha conosciuto che le femmine, sono indicati come provenienti dal Capo di Buona Speranza. Essi facevano parte della Collezione Serville, che oggidì è riunita alla mia." I have not studied Rambur's types, but his description seems to agree with that of *caffra*.

The agreement of the descriptions of *subfasciolata* Brauer (the type of which I have not studied) with that of *caffra* likewise induces me to regard that name as synonymous.

I have compared two of the six types of *truncatum* Calvert and am satisfied that they also are *caffra*.

A re-examination of the two individuals referred to *caffra*, on Dr. Hagen's authority, in Proc. U. S. Nat. Mus. xvi, p. 584, will be necessary before deciding whether they really are such.

6. **Orthetrum Abbottii** Calvert.

O. a. Calvert, Trans. Am. Ent. Soc. xix, p. 162, 1892; Proc. U. S. Nat. Mus. xviii p. 133, 1895 (1896).—Kilima Njaro.

I saw (and, I believe, labeled) some individuals in the Museum für Naturkunde, at Berlin, and in the K. K. Hofmuseum, at Vienna, which I regarded as belonging to this species, but I can not find any note as to the localities from which they came. I did note that these individuals had one row of cells between the subnodal sector and the supplementary sector next below, that the membranule was somewhat grayish, and that the male at Vienna has 9 (right) 8 (left) postnodals on the front wings. The male at Vienna was placed under *anceps* Schneider, but I believed that at least two species were there included. I know nothing of the types of *anceps*, which was described from females from Asia Minor, but a comparison of the description in Revue des Odonates, p. 291, with mine of 1896 shows the following differences:

	Anceps ♀	*Abbottii* ♀
Abdomen	29.7 mm.	24
Hind wing	33.7	29
Pterostigma	2.8	3.5
Vertex	strongly crenate	truncated
Vulvar lamina	broadly crenate	straight, entire
Wings	uncolored (adult), of a yellow tint on the costal border and especially at the base (young).	an extremely small fulvous cloud at base of the long veins.
Abdominal segments	with two small posterior black spots on each segment, 8–10 chiefly olive (adult) or yellow (young)	such spots absent, 8–10 chiefly black.

If the male from Beirut, doubtfully referred to *anceps* by de Selys (Ann. Soc. Ent. Belg. xxxi, p. 16, 1887), really be that species, then we have the following differences for the male sex:

	Anceps? ♂	*Abbottii* ♂
Abdomen	22.5 mm.	25. mm.
Hind wing	26.	28.
Pterostigma	2.	3.5-4
Anterior lamina	little prominent	more prominent than any other genital piece
Front wings with	10 antenodals 6 postnodals	12 13 antenodals 8 10 postnodals

Herr Förster erroneously refers (Ent. Nach. xxiv, p. 172, 1898) to "das Fehlen der Hypertrigonalqueradern im Vorderflügel" of *Abbottii*. Their presence is mentioned in my longer description which he quotes in the footnote to p. 168.

Is *Orthetrum Phillipsi* Kirby, Proc. Zool. Soc. Lond. 1896, p. 522, from Somaliland, the same as *Abbottii?*

7. **Orthetrum farinosum** Förster.

O. f. Förster, Ent. Nach. xxiv, p. 169, 1898.—Transvaal.

I have not seen this species, but have placed it in the preceding key from the excellent description alone. Herr Förster believes it to be allied to *Abbottii*, but two of the distinctions which he draws between the two species are, I believe, of no value. These are the number of rows of posttriangular cells in the hind wings, and the position of the submedian cross-vein in the front wings. The *three* rows of posttriangular cells of the hind wings of *Abbottii* are due to the wide separation of the sectors of the triangle, so that two of the three rows lie above, the third below, the upper sector.

The absence of hypertrigonals in *farinosum* may be a more constant difference, although variations of this kind occur in the types of *caffra* and of *chrysostigma*.

8. **Orthetrum trinacria** Selys.

Lib. t. Selys, Rev. Zool. 1841, p. 244; Rev. Odon. p. 1850; Ann. Soc. Ent. Belg. xxxi. p. 19, 1887. McLachlan, Journ. Linn. Soc. Lond. Zool. xvi. p. 178, 1882.—Sicily, Egypt, Senegal. *O. t.* Calvert, Proc. U. S. Nat. Mus. xviii, p. 145, 1895 (1896).—Tana River, East Africa. McLachlan, Ent. Mo. Mag. (2) viii, p. 153, 1897.—Algeria. Karsch, Ent. Nach. xxi, 1895. Selys *l. c.* is authority for the synonyms *Lib. clathrata* and *Bremii* Ramb. Névr. p. 48, 1842.

9. **Orthetrum azureum** Rambur.

Lib. a. Ramb. Névr. p. 68, 1842. Selys, Rev. Odon. p. 292, 1850.—Madagascar.

Rambur's type was a female, now in Baron de Selys' collection, which also contains a male bearing this specific name on the pin. I made the following notes on them in August, 1896:

Azurea Ramb., according to the ♂ specimen so pin-labeled in Selys' collection (although without any Serville label), is very similar to *Ransonneti* in having no color at base of the wings, grayish-white membranule and no hypertrigonals on any wings. The frons is not more prominent than in *brachialis* [Calv.=*contractum* Ramb.], the hamule is the most prominent part of the genitalia and has the external branch longer and very much thicker than the internal branch, the genital lobe is oblong, longer than wide; abdomen not contracted at 3. Arculus at the second antenodal, hind wings with the inner side of the triangle in prolongation of the arculus and sectors of the triangle separated at their origins, inner and outer ends of the pterostigma parallel.

Rambur's female type in Selys' collection has hypertrigonals on the front wings, base of the wings yellowish as far as the triangle; otherwise as in the male.

10. **Orthetrum Ransonneti** Brauer.

Lib. R. Brauer, Verhdl. z.-b. Gesell. Wien, xv, p. 1009, 1865, translated by Selys, Ann. Soc. Ent. Belg. xxxi, p. 20, 1887.—Sinai peninsula.

The following notes on the two types of Brauer in the K. K. Hofmuseum at Vienna were made by me in March, 1896.

The two types of *Ransonneti* Brauer differ from *brachialis* [Calv.=*contractum* Ramb.] in genitalia—not easily examined: genital lobe more prominent than other parts, hamule with external branch shorter than the internal branch and shorter than in *brachialis*; in the more prominent frons and clypeus, which, when viewed from above, have an antero-posterior length equal to one-half the greatest antero-posterior dimension of the eyes, whereas in *brachialis* the frons is one-third of this dimension of the eyes; paler reticulation, especially of costa and antenodals; the more trapezoidal form of the pterostigma inasmuch as the inner end is more nearly at right angles to the costa than the outer end, whereas in *brachialis* the two ends are nearly parallel; pterostigma paler, yellowish; no color at the base of the hind wings, membranule grayish-white, wings more pointed at apex, no hypertrigonals on any wings, arculus of all wings between the first and second antenodals, submedian cross-vein on the front wings nearer than the first antenodal, inner side of the triangle of the hind wings a little nearer the base than is the arculus; abdomen less contracted at 3; third tibiæ with 9 spines on either side. The two types have the body pruinose.

11. **Orthetrum leoninum** Karsch.

O. l. Karsch, Ent. Nach. xvii, p. 59, 1891.—Sierra Leone.

Two nominal species of *Orthetrum*, *brevistylum* Kirby, Proc. Zool. Soc. Lond. 1896, p. 521, and *lorti* Kirby, *l. c.* p. 522, each based on a single individual from Somaliland, present, as pointed out by their describer, differences of generic value. Whether these differences will prove constant remains to be determined by larger series.

Libellula Marchali Rambur, from Mauritius, placed in *Orthetrum* in Mr. Kirby's Catalogue of Odonata, p. 36, does not belong to this genus, according to my notes on the two type males, one lacking the head, the other lacking the abdomen, labeled "Maurice", at Oxford. So also the *Orthetrum laterale* of Kirby's Catalogue *l. c.*, is a *Trithemis*, as pointed out on page 65, *ante*.

Besides the species here treated of, the following *Orthetra* occur in Africa: *cancellatum* L., *Ramburii* Selys and *nitidinerve* Selys along the Mediterranean coast; *sabina* var. *africana* Selys from the Cameroons, and *annulatum* Beauvois, of Owara, etc. To the knowledge of these and of the species just described by Mr. Kirby in the Annals and Magazine of Natural History for September, 1898, I can add nothing.

CORRECTIONS AND ADDITION.

Page 32, under (*f*) King's collection, change *Libellula* 23. *analis to* 22. *Tillarga*.
Page 35, last line of text and first line of footnote, change * to †.
Page 40. No. 13 Agrion hastulatum. Add: De Selys (Bull. Acad. Belg.—2—xli, p. 273, 1876) refers "Agrion hastulatum, Burm., no. 13 (Pars: l'exemp. du Cap.)" to *Ischnura senegalensis* Rambur.

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EXPLANATION OF PLATE I.

Fig. 1. Apex of abdomen and terminal appendages of *Agrion* [*Lestes*] *cingulatum* ♂, viewed obliquely from above, left superior appendage omited. X 23.

Fig. 2. The same of *Agrion* [*Pseudagrion*] *caffrum* ♂, dorsal view. X 25.

Fig. 3. The same of *A. caffrum* ♂, profile view, right side. X 25.

Fig. 4. The same of *Agrion* [*Lestes*] *plagiatum* ♂, dorsal view, left superior appendage omitted. X 22.

Fig. 5. Genitalia of second abdominal segment of *Libellula* [*Sympetrum ?*] *castanea* ♂, inverted, profile view, left side. X 15.

Fig. 6. The same of *Libellula* [*Trithemis*] *stictica* ♂, ibid. X 15.

Fig. 7. Apex of the abdomen of *Libellula* [*Dasythemis*] *venosa* ♀, profile view, right side. X 8.

Fig. 8. Genitalia of second abdominal segment of *Libellula* [*Trithemis*] *aurora* ♂, inverted, profile view, right side. X 15. The dotted line shows the outline of the penis.

Fig. 9. Apex of the abdomen and terminal appendages of *Agrion* [*Lestes*] *virgatum* ♂, dorsal view. X 21.

Fig. 10. Genitalia of second abdominal segment of *Libellula* [*Trithemis*] *pulla* ♂, inverted, profile view, left side. X 25.

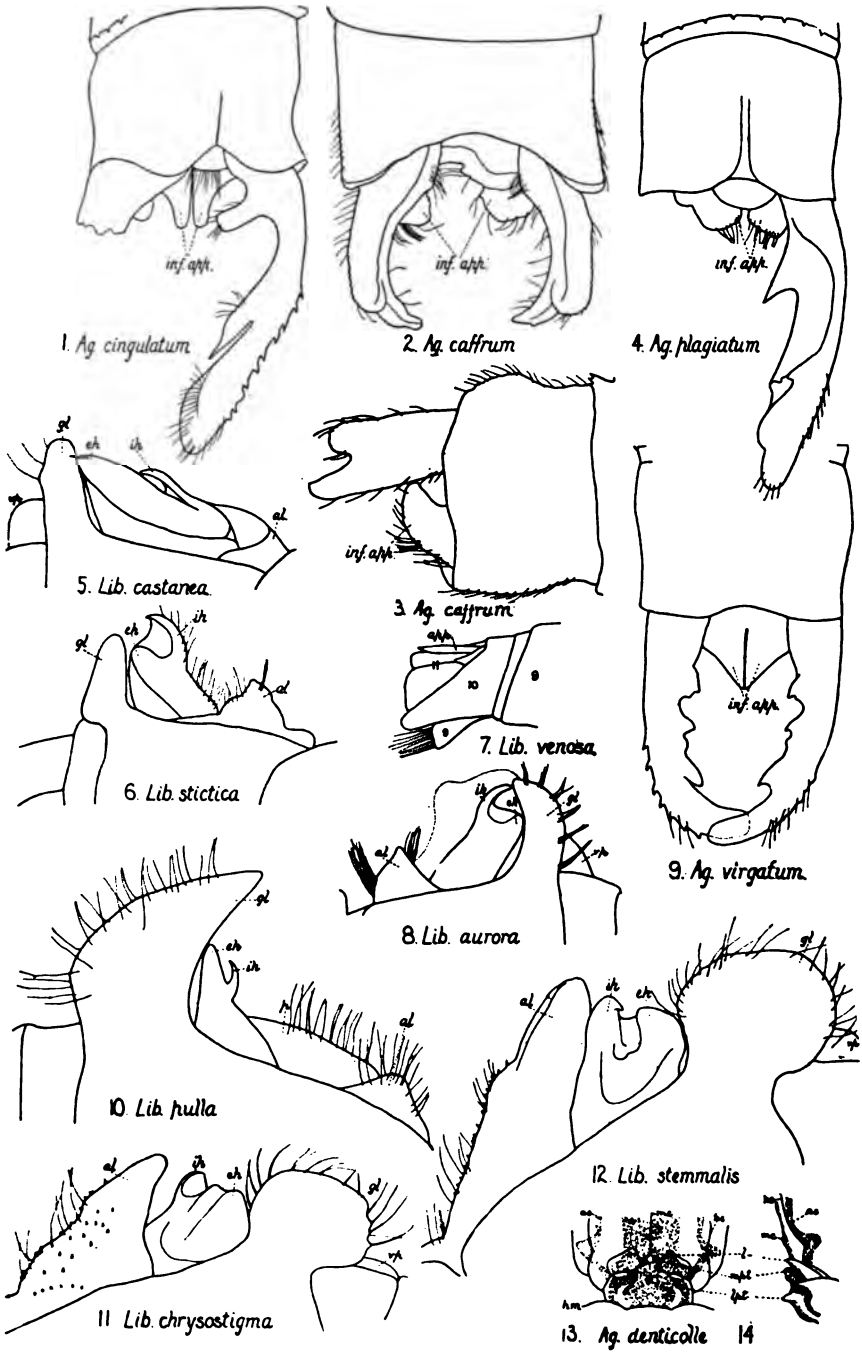
Fig. 11. The same of *Lib.* [*Orthetrum*] *chrysostigma* ♂, ibid., right side. X 20.

Fig. 12. The same of *Lib.* [*Orthetrum*] *stemmalis* ♂, ibid., right side. X 20.

Figs. 13, 14. Dorsal and profile (left side) views of prothorax and anterior part of mesothorax of *Agrion* [*Ischnura*] *denticolle* ♀. X 10. Shaded parts show dark-unshaded parts light-colored areas of the insect. *as* antehumeral stripe, *hm* hind margin of head, *hs* humeral suture, *l* lamina concealing the mesostigma, *lpt* lateral tooth of prothorax, *mc* mid-dorsal carina, *mpt* median dorsal tooth of prothorax.

In other figures: *al* anterior lamina, *eh* external hamular branch, *gl* genital lobe, *ih* internal hamular branch, *p* penis, *vp* vesicle of the penis, *inf. app.* inferior appendages.

Figs. 1, 4, 6, 9, 10, 13, 14 were enlarged by camera lucida from freehand drawings of the types at Halle; 2, 3, 11, 12 are camera drawings from the types at Cambridge; 5, 7, 8 are freehand drawings from types at Cambridge.


inf. app.
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2. Ag. caffrum
4. Ag. plagiatum
5. Lib. castanea.
3. Ag. caffrum
6. Lib. stictica
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12. Lib. stemmalis
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REVISION OF THE SPECIES OF APION OF AMERICA NORTH OF MEXICO.

BY H. C. FALL.

The present essay is the second attempt to treat systematically the species of *Apion* occurring within our faunal limits, the first having been presented by Prof. John B. Smith – Trans. Am. Ent. Soc., 1884. For various reasons, chief among which perhaps are the brevity of the descriptions and the failure to recognize sexual characters, this paper has not proved as useful as was hoped; and on undertaking the study about a year ago, it was found that with the exception of the material in the collections of Drs. LeConte and Horn, and the National Museum, which had served as the basis of the paper referred to, there was scarcely a collection in the country which evinced more than a half hearted attempt at specific separation, to say nothing of subsequent identification. Thus the time seems ripe for a complete revision of the genus, and a study which was begun for the sole purpose of separating the local material in my cabinet has expanded until upward of four thousand individuals have been examined, including, in most cases, the entire material of Drs. Horn, Hamilton and Dietz, Messrs. Hubbard, Schwarz, Blanchard, Wickham, Liebeck, Fuchs, Leng, Bowditch, Capt. Casey and the National and Cambridge Museums.

To all the above-named gentlemen I desire at the outset to express my appreciation of their most cordial response in the way of material. I am, moreover, especially indebted to Dr. Horn and Messrs. Blanchard and Schwarz for bibliographical assistance and much kind advice and encouragement; also to Messrs. Henshaw, Howard and Linell for many courtesies extended during my visits to the Cambridge and Washington Museums.

It need hardly be said that the task has been far from an easy one, and none perhaps will realize its shortcomings more fully than myself; yet it is hoped that the results constitute at least a step toward a more exact knowledge of these interesting though much neglected insects, and that the employment of characters which have been found useful in the very large material before me will enable the student, who possesses experience, tact and a fair series of specimens, to place with reasonable certainty whatever comes before him.

The number of new forms described in the following pages is sensibly equal to the number of old names retained as valid, and raises the total number of species to above one hundred. Large as this total seems, it is still less than half the number catalogued from the European fauna. We may infer from this that a considerable number of new forms remain to be discovered, though it is likely that when all are known we shall still fall far short of Europe in this respect.

As an example of the richness of the European fauna: from the Netherlands alone—a bit of country about equal in area to the State of Maryland, and far less diversified in surface—Everts* records no less than eighty-seven species; while Bedel† enumerates ninety-seven as inhabiting the basin of the Seine.

The country about Washington, D. C., has doubtless been as thoroughly explored as any limited area in the United States, and here an area equal in size to the Netherlands, which would include the country within a radius of about sixty-five miles of the city, shows only twenty-five species.

Not only are our species less numerous, they are also smaller on the average, and lack entirely the brighter tints which adorn not a few of their trans-Atlantic cousins.

Before proceeding to a statement of generic characters, it seems appropriate to pass briefly in review, in chronological order, the species described up to the present time:

1797. Herbst-Käfer, VII, described *nigrum*.

1826. Say, Jour. Acad. Nat. Sci. Phila., described *rostrum*, and in 1831—Curc. – *segnipes*. Both are well-known species.

1833. Gyllenhal, Sch. Curc., I, redescribed *rostrum* Say under the name *sayi*.

1839. Boheman, Sch. Curc., V., described *pennsylvanicum* and *porcatum*. The former is somewhat doubtfully, and the latter certainly recognized.

1839. Gyllenhal, Sch Curc., V, *reconditum*, not recognized.

1843. Mannerheim, Bull. Mosc., described *troglodytes* and *cuprescens*. The latter species, described from Alaska, has not yet been proved identical with any known to us, but there are reasons for believing it to be the æneous form of the species later described by LeConte as *proclive*.

* Budrage tot de Kennis der Apioniden-Tydschrift voor Entomologie, 1878.

† Faune des Coléoptères du Bassin de la Seine.

1854. Gerstaecker, Stett. Ent. Zeit., described many species from both North and South America. Among them the following are credited to our fauna: *cinereum, melanarium, metallicum, nodirostre, subglobosum* and *vile.* Of these, *cinereum* is Say's *segnipes; melanarium* is doubtfully recognized; *metallicum*, suppressed by Smith as a synonym of *troglodytes* Mann., but erroneously, as I believe, is now restored; *nodirostre, vile* and *subglobosum* are still unknown. It is more than likely that the last named species was not taken within our faunal limits.

1857. LeConte, Pac. R. R. Expl. and Surv., described *cavifrons, crassinasum, cribricolle, proclive* and *protensum. Crassinasum* and *proclive* are the sexes of the same species; *protensum* is still unique.

1858. LeConte, Proc. Acad. Nat. Sci. Phila., adds *œdorhynchum* and *ventricosum.*

1867. Walsh, Proc. Ent. Soc. Phila., described *lanuginosum.* This name being preoccupied was changed by Smith to *walshii.*

1884. Smith, Trans. Am. Ent. Soc. Phila., adds 48 species, of which 12 have been by himself, or are in the following pages, reduced to synonymy, viz.:

erythrocerum	= *pennsylvanicum*
estriatum	= *erraticum* ♀
ovale	= *obsoletum* ♀
obesum	= *robustum* ♀
parvulum	= *minutum*
californicum	= *sordidum* var.
concoloratum	= *carinatum*
brevicolle	= *cribricolle* Lec.
capitatum	= *oblitum*
typicum	= *ventricosum* Lec.
vicinum	= *walshii*
fraternum	= *griseum.*

1 84. Casey, Bull. Brook. Ent. Soc., described *vespertinum.* This is shown farther on to be the same as *californicum.*

1887. Smith, Entom. Americana, described *lividum.*

For a statement of the characters of the genus the student is referred to the "Classification."

The production of the interior angle of two or more pairs of tibiæ of the male in many species into a more or less developed spur or

mucro; and the metasternum as short, or shorter than the first ventral segment, with the accompanying rudimentary wings in a few others, may be set down as exceptions to the characters there given.

In addition, it may be said that the beak varies greatly in length, form and sculpture. It is usually about as long as the head and prothorax, but varies from scarcely as long as the thorax (*emaciipes*) to more than half the length of the entire body in certain females of *varicorne*, *coloradense* and *pennsylvanicum*. The eyes are generally more or less broadly elliptical in shape with the longest diameter a little oblique to the vertical, but are sometimes nearly circular, and in one species (*persimile*) they are obviously narrowed inferiorly. The granulation also varies somewhat in coarseness and convexity, but has not been used at all for specific separation, and is but once or twice alluded to in the descriptions. The width of the front between the eyes, whether greater than the width of the beak at tip, as is usual, or less, as is occasionally the case, has been used with advantage. The place of insertion and relative lengths of the basal joints of the antennæ are quite variable, and have been largely used in the scheme which follows. The point of insertion is never beyond the middle, usually much nearer the base, and in a few species quite close to the eyes—(*perminutum*, *propinquicorne*, etc.). It has been found more convenient to indicate this distance by stating which joint of the antennæ reaches the eye; or more properly, which joint would reach the eye if the antennæ could be directed against it. The first joint may be very little longer than the second, or it may be equal to or even exceed the three following in length. The second is always as long, usually a little longer than the third; the succeeding joints are gradually shorter, but it is not often that the outer joints become transverse.

The prothorax is usually more or less transverse with sides rounded between the generally evident apical and basal contractions. The variations here, as well as in the form of the elytra, can best be appreciated by referring to the accompanying plates. The abdominal punctuation is very variable, and with a little experience is quite useful, especially in the first section of the genus. The third and fourth ventrals are, as a rule, impunctate, or with but a few small punctures toward the sides. Unless otherwise stated, by abdominal punctuation, or simply "punctuation beneath," is meant that of the first two segments.

The legs vary in length, and through all degrees from stout to slender. The front tibiæ are always more or less distinctly longer than the others, the middle tibiæ being the shortest of the three. The first tarsal joint is usually from two to three times as long as wide; very rarely (*xanthoxyli*) as wide as long; the second and third joints are less elongate, and the last projects to a variable degree beyond the lobes of the third.

In the majority of species the sexes are well differentiated, but in a considerable number scarcely at all so. The parts sexually modified are the beak, antennæ, elytra, metasternum, coxæ, femora, tibiæ and tarsi, all of which are referred to in the proper places. In general, when both sexes are present, the males may be distinguished by the shorter, more coarsely sculptured beak; and in the vast majority of specimens the position of the tip of the abdomen will reveal the sex—this being visibly deflected in the male, and more or less retracted in the female. The very frequent rounding of the sutural angles of the elytra in the male, combined with the deflection mentioned, usually exposes the small terminal dorsal segment which is always present in this sex. In a few species—e. g. *herculanum*—the abdomen is, in my experience, always more or less retracted at tip, and the presence of the additional segment can only be determined by removing an elytron.

The chief characters employed by Wencker and other European writers in the arrangement of their species seem to have been the beak—form and length,—claws, insertion of antennæ, color and vestiture, in about that order. With the exception of the form of the claws, I have been unable to use any of these characters for the larger subdivisions of our series. In their stead I have drawn to a considerable extent upon the sexual characters, as seeming to afford a more natural as well as more definite basis for grouping the species. Prof. Smith in his synopsis says: "The tarsal claws seemed at first to offer the most natural division, but while a large part of the species have the claws dentate in both sexes, and a few seem to have them simple in both sexes, there are some species in which the males have the claws toothed, while the females have them simple." I have in my study been quite unable to detect any appreciable sexual differences of this nature, and am forced to conclude that the supposed sexes of one species were really individuals of different species.

It may be of interest to say in this connection, that in specimens of the European *ulicis* and *fuscirostre* before me I do note a sexual

difference in the claws—these being strongly toothed in the female and nearly simple in the male—a fact peculiar in itself, and one which is not mentioned in any European literature to which I have had access.

While the form of the claws as a primary means of division does not, I am sure, result in a perfectly natural arrangement, there would appear to be no other which can be so satisfactorily used, and the few species which now seem out of place will have to wait until a more rational scheme can be devised.

I have endeavored to make the descriptions following as full as need be in all essential matters, without rendering them unnecessarily prolix by the introduction of a mass of details, which are either so constant in large numbers of species, or so subject to individual variation as to serve no useful purpose. In measurement of length the beak is always excluded. By the dilation of the beak is always meant the expansion over the insertion of the antennæ as seen from above. The term mucronate has been uniformly used in referring to the armature of the male tibiæ, though it is possible that the term unguiculate would have been more appropriate in some instances.

Following lines already indicated, our species are primarily divided into four sections, as follows:

Claws simple or nearly so.
  Anterior femora of the ♂ more or less swollen or tuberculate and with a polished area toward the tip.....I.
  Anterior femora of ♂ unmodified.....II.
Claws evidently toothed near the base.
  Tibiæ of ♂ wholly or in part mucronate at tip.....III.
  Tibiæ of ♂ unarmed at tip.....IV.

A few of the species in Section II have the claws of such a shape as to occasion some doubt as to the series in which they should be placed; should the student fail to locate his species in the series with toothed claws, he would do well to revert to Section II before giving up the search.

I.

The members of this series form a natural group, probably of subgeneric value, and, so far as known, peculiar to our fauna. In general facies certain species are in a few instances rather closely paralleled by members of one or another of the other sections; from all these, however, the sexual characters sharply separate them. The form is generally slender, the pubescence sparse or nearly

wanting, the surface more shining than usual. The intromittent organ of the male is subcylindrical, blunt, and rounded at the tip instead of flattened, and rather suddenly acuminate, as in the other sections.

Sexual differentiation here reaches its greatest development. In the male the beak is shorter, dilated at the base, and more strongly sculptured. The first joint of the antennæ is generally shorter, the second bears near the base, on the upper side, several closely-placed, minute setæ, which, under moderate power, have the appearance of a small denticle. The front thighs are more or less swollen or tuberculate on the inner face toward the tip; the inferior, and to a greater or less extent, the lateral surface of the swelling is polished, the polished area being often marked by parallel longitudinal striæ, which differ in coarseness and approximation in the different species. The thigh is usually distinctly longitudinally concave or grooved beneath at the tip, the concavity limited externally by a more or less well-defined ridge. The femoral swelling becomes nearly or quite obsolete in a very few species, but the polished area beneath is always evident. The front tibæ are rather suddenly though not very strongly widened at about the basal fourth, the middle and the hind tibiæ are armed at the tip with a small mucro which is frequently almost concealed by the terminal spinules. The metasternum bears, near the middle of the posterior margin, two rather distant, small, acute tubercles or spinules, which are sometimes faintly indicated in the female.

The tips of the elytra are frequently conjointly produced into a more or less prominent lobe in the female.

This group has proved by far the most troublesome of the four, and I cannot reasonably hope to have discovered in all cases the true specific limits. It is quite possible that the sexual characters used are not as constant as they are assumed to be, and only the patient study of accumulated examples from carefully recorded localities can remove the doubts which must accompany any arrangement based on the limited material now in collections.

Of four species—*protensum*, *atripes*, *anceps* and *quadricolle*—females only have been seen; these species must, therefore, be considered as tentatively placed for the present.

The following table is the best I am now able to offer:

Front thighs with a conspicuous tubercle in the ♂.....1.
Front thighs (♂) merely swollen toward the tip.....4.
Front thighs (♂) not or scarcely perceptibly enlarged.....5.

1. Abdomen coarsely closely punctate (Pl. 2, fig. 12).....2.
   Abdomen much more finely sparsely punctate (Pl. 2, fig. 13).....3.
2. Size large—2 mm. or over.
   Prothorax with base and apex subequal.
   Prothorax longer than wide.....1. **erraticum.**
   Prothorax as wide as long.
   Humeri evident, body more parallel, less convex, legs rufous.
   2. **impeditum.**
   Humeri absent, body more ovate, more convex, legs black.
   3. **quadricolle.**
   Prothorax with base noticeably wider than the apex.
   Stouter, sides of prothorax not prominent at the middle, elytra widest at the middle.....4. **protensum.**
   More slender, sides of prothorax rather prominent at the middle, elytra widest behind the middle.....5. **impunctistriatum.**
   Size small, always less than 2 mm.
   Prothorax longer than wide, densely punctate, legs black.
   6. **coracellum.**
   Prothorax as wide as long, sparsely punctate, legs and antennæ red.
   7. **anceps.**
3. Prothorax wider than long, sides arcuate, body robust.....8. **atripes.**
   Prothorax longer than wide, body more slender
   Polished area of anterior femora (♂) plainly longitudinally strigose.
   Anterior tibiæ (♂) strongly widened apically.....9. **finitimum.**
   Anterior tibiæ (♂) slightly wider in apical three-fourths....10. **virile.**
   Polished area of anterior femora (♂) nor strigose or with the striæ few and inconspicuous.
   Humeri moderate.
   Infra limiting ridge of anterior femora (♂) strong....11. **melanarium.**
   Infra limiting ridge feeble or absent.
   Very narrow, size small, less than 2 mm.....12. **floridanum.**
   More robust, size large, 2.5 mm.....13. **robustum.**
   Humeri wanting.....14. **obsoletum.**
4. Beak short, dilated at base and almost completely shining beyond the dilation in both sexes.....15. **ellipticum.**
   Beak of female not dilated at base.
   Size small, seldom exceeding 1.5 mm.
   Legs and antennæ rufous, beak (♂) stouter, humeri wanting or but faintly indicated.....16. **desolatum.**
   Legs black, or at most rufo piceous, beak (♂) more attenuate.
   Humeri wanting.
   Beak sinuate toward the base, intervals flat, abdomen nearly impunctate.
   17. **sinuirostrum.**
   Beak as usual, intervals more or less convex, abdominal punctures coarse and numerous.....18. **molestum.**
   Humeri distinct.
   Larger, body more ovate and more longitudinally convex, beak longer.
   19. **minutum.**
   Smaller, body more parallel, less convex, beak shorter.20. **texanum.**
   Size larger, seldom less than 2 mm.....21. **pennsylvanicum.**

5. Humeri present.

Elytral intervals convex, surface opaque.....22. **funereum.**
Elytral intervals flat, surface somewhat shining.....23. **occidentale.**
Humeri wanting.....24. **hesperum.**

1. **A. erraticum** Smith.—Very narrow, convex, black; legs sometimes rufopiceous; pubescence sparse. Beak (♂) rather strongly curved, subequal to the head and prothorax; (♀) a little more slender and nearly one-third longer, not dilated, strigose, except in apical third (♂), or even half (♀), which is polished; punctuation sparse but distinct. First antennal joint equal to the next two (♂) or a little longer (♀), third joint much more slender, but nearly or quite as long as the second, and about one-half longer than the fourth. Front barely wider than the tip of the beak, canaliculose; eyes not very prominent. Prothorax longer than wide; base not wider than the apex; sides feebly arcuate, a slight sinuation before the base; surface closely not coarsely punctate; dorsal line distinct but never complete. Elytra very narrow, sides parallel; humeri small, oblique; intervals flat, not twice as wide as the striæ. Beneath strongly, moderately, densely punctate; legs long, rather thin; claws with a very small, obtuse tooth. Length 1.9-2.3 mm.; .08-.09 inch. (Pl. II, figs. 1 and 1*a*).

♂. Sutural angles less prominent, but scarcely rounded; second joint of antennæ setiferous; anterior tibiæ more suddenly and more strongly widened; femoral tubercle strong, rounded; smooth area with fine, distant striæ; limiting ridge absent Middle and hind tibiæ mucronate. Metasternal spicules long.

♀. Sutural angles more prominent, but not prolonged; other parts unmodified.

Hab.—Texas.

Taken by Mr. Schwarz at Columbus, and at Luling, a little west, by both Mr. Wickham and myself. Two specimens in the National Museum collection are labelled Montana.

2. **A. impeditum** n. sp.—So like the preceding in size, outline and sculpture that a statement of the chief points of divergence will be sufficient for its recognition. The beak is a little stouter and less elongate, especially in the female. The antennæ are less slender, the eighth joint being at least as wide as long. Prothorax very little if at all longer than wide; dorsal line nearly complete; humeri a little less oblique. Tarsi stouter; second joint as wide as long; always noticeably longer than wide in *erraticum*. Surface less shining, legs more evidently rufous. The sexual characters are the same as in *erraticum*, except that the femoral tubercle is less developed. (Pl. II, fig. 4).

Hab.—New York (Peekskill), District of Columbia.

A single male in my own collection from the former and two females from the latter locality are all that I have seen. In one of the females the surface is decidedly rugulose and subopaque. In the single male the first antennal joint is shorter than in males of *erraticum*.

3. **A. quadricolle** n. sp.—Entirely black, not very shining. Beak cylindrical, strongly arcuate, a little longer than the head and prothorax (♀). First antennal joint barely equal to the two following. Front subcanaliculose and punctate; eyes moderately prominent. Prothorax quadrate, base and apex

equal; sides parallel, scarcely at all prominent at the middle; dorsal line nearly complete. Elytra strongly, longitudinally convex; humeri entirely wanting; sides evenly arcuate; intervals flat, twice as wide as the striæ. Length 2 mm.; .08 inch. (Pl. II, figs. 2 and 2*a*).

Described from a single female from Mississippi in Mr. Wickham's collection. Again closely allied to *erraticum* and agreeing with it in such points of detail as are not mentioned in the above short description. It is, however, clearly distinct by its shorter, much more longitudinally, convex elytra, complete absence of humeri and square thorax.

4. **A. protensum** Lec.—Black, sparsely pubescent. Beak moderately arcuate, a little longer than the head and prothorax, strigose and moderately coarsely but somewhat vaguely punctate throughout its length. First joint of antennæ as long as the next two, united; second scarcely reaching the eye. Eyes not very prominent. Prothorax a little longer than wide, the base distinctly wider than the apex; sides very feebly arcuate and subparallel in basal two-thirds; surface rather densely punctate; dorsal line nearly complete. Elytra regularly oval, widest almost exactly at the middle; humeri scarcely evident. Abdomen coarsely, deeply, closely punctate. Length about 2 mm.; .08 inch.

Hab.—California (San Francisco).

This species is represented only by the type in the LeConte cabinet, from which the above short diagnosis is drawn. It is a female and has the tips of the elytra somewhat produced. It is one of a small number of species having the abdomen coarsely, closely punctate, from all of which the characters in the table should readily separate it. The form of the elytra—widest at the middle—is an unusual character in this group.

5. **A. impunctistriatum** Smith.—Elongate, black, shining; pubescence almost wanting. Beak (♂) a little shorter than the head and prothorax, moderately stout for this section, not strongly arcuate, cylindrical, noticeably dilated at basal third, strigose and with a few fine punctures, except at the apex, which is more or less polished; (♀) much longer, very slender, not dilated. Antennæ slender, first joint equal to the next two (♂), or three (♀), second, third and fourth joints very slightly decreasing in length; second reaching the eye. Front more or less canaliculose; eyes rather prominent. Prothorax longer than wide; base a little wider than the apex; sides moderately dilated at the middle; dorsal line complete; punctuation moderately dense. Elytra rather broadly ovate, widest near the middle; humeri and posthumeral sinuation well marked; intervals flat or nearly so, twice as wide as the striæ. Beneath coarsely, closely punctate. Length 2 2.2 mm.; .08–.09 inch. (Pl. II, figs. 3, 3*a*, 5 and 19).

♂. Sutural angles rounded, second antennal joint setiferous; anterior tibiæ more suddenly widened; femoral tubercle prominent; smooth area closely striate; limiting ridge not very strong; middle and hind tibiæ with small mucro; metasternal spicules moderate.

♀. Sutural angles produced; other parts unmodified.

Hab.—Western Pennsylvania (Hamilton), Ohio, Illinois, Texas.

The humeri vary somewhat in prominence, and in many examples the sutural stria is more strongly impressed. The trivial name is misleading. There is indeed considerable variation in the depth and approximation of the strial punctures in different species, but there is no species in which they are not plainly visible.

6. **A. coracellum** n. sp.—Moderately slender, entirely black, more or less bronzed; pubescence fine and very sparse. Beak (♂) a little shorter than the head and prothorax, stouter in basal third, nearly parallel and slender beyond the insertion of the antennæ; shining in apical two-fifths; a vague sulcus over the antennæ; punctuation fine and sparse; (♀) much longer, very slender, not dilated, smoother. First antennal joint as long as the next three, second about reaching the eye. Front punctate and subcanaliculose; eyes rather small, a little more prominent in the male. Prothorax a little longer than wide, cylindrical; sides slightly prominent at the middle; surface rather densely not coarsely punctate; dorsal line nearly complete. Elytra of the usual form; humeri rather small but prominent; posthumeral sinuation well marked; intervals flat. Beneath rather densely, moderately, coarsely punctate; claws nearly simple. Length 1.6 mm.; .065 inch.

♂. Sutural angles rounded; femoral tubercle not very prominent; smooth area not striate; limiting ridge moderate; other characters as usual.

♀. Sutural tips very slightly prolonged.

Hab.—District of Columbia.

Very few specimens seen, and all from one locality. It superficially resembles several others, and without especial care might easily be confounded with specimens of *texanum* and *minutum*, in which the abdominal punctuation is closer than usual. *Texanum* is always smaller and more slightly built, and *minutum* has the elytra noticeably shorter and more ventricose, while both have the prothorax less densely punctate, and the anterior femora of the male less prominently swollen.

7. **A. anceps** n. sp.—Black, legs and antennæ rufous; pubescence almost wanting. Beak (♀) subequal to the head and prothorax, slender, moderately arcuate, not dilated, finely sculptured, scarcely punctate, tip smooth. First joint of antennæ about equal to the two following, third scarcely longer than the fourth, second reaching the eye. Front with three rows of confluent punctures; eyes prominent. Prothorax slightly wider than long, widest slightly behind the middle; apical and basal constrictions evident: dorsal line nearly complete; punctures large, rather shallow, not closely, rather unevenly distributed. Elytra narrow: humeri small but evident: striæ shallow with widely-spaced punctures; intervals flat. Beneath coarsely, rather closely punctate; claws with a small tooth. Length 2 mm.; .08 inch.

Hab.—Illinois.

Described from a single female sent by Mr. Blanchard, who

kindly allows me to retain the type. It seems so very different from anything else that I have ventured a description in the absence of the male.

8. **A. atripes** Smith.—Very robust for this section: entirely black without æneous lustre: pubescence almost wanting. Beak (♀) a little shorter than the head and prothorax, slender, cylindrical, rather strongly arcuate, finely strigose, except toward the apex; punctuation fine, sparse. First antennal joint as long as the next two, third distinctly longer than the fourth, second reaching the eye. Front canaliculate; eyes very prominent. Prothorax wider than long; sides arcuate, moderately, closely punctate; median line nearly complete. Elytra less than half longer than wide; humeri moderate, post-humeral sinuation not evident; sides slightly divergent to the middle: striæ moderate: intervals nearly flat, twice as wide as the striæ. Beneath rather finely not closely punctate. Legs not very slender: claws nearly simple. Length 1.8 mm.; .07 inch. (Pl. II, fig. 18).

Hab.—District of Columbia, Virginia, Georgia.

Single females from each of the above localities in the collections of Mr. Schwarz, Dr. Horn and myself are all that I have seen of this apparently rare species. Smith cites also California, but, I have no doubt, erroneously. In the absence of the male this species is doubtfully assigned to the group with prominently tuberculate femora. The large thorax, short elytra, short slender beak (♀) and very prominent eyes will make it always easily recognizable.

Since the above was written I have seen in the LeConte collection a fourth example, also a female, from Florida. In this last the feet are brownish.

9. **A. finitimum** n. sp.—Elongate, black; legs sometimes piceous brown; elytra with faint violaceous lustre; pubescence almost wanting. Beak (♂) barely as long as the head and prothorax, moderately curved, strongly almost angularly dilated, a little more slender beyond the dilation; surface finely, rather sparsely punctulate, polished in about apical half; (♀) much longer, very slender, cylindrical, not at all dilated, almost entirely polished. First joint of antennæ about equal to the next two (♂), or three (♀), third joint reaching the eye. Front canaliculose; eyes moderate. Prothorax as wide at the middle as long; base a little wider than the apex; sides rather more than usually prominent at the middle; punctuation rather fine and close; dorsal line nearly complete; humeri evident; elytra not strongly widened at the middle; striæ moderate; intervals rather wide, flat. Beneath finely, rather sparsely punctate; claws merely thickened at the base. Length 1.8–2 mm.; .07–.08 inch. (Pl. II, figs. 6 and 15).

♂. Sutural angles rounded; second joint of antennæ triangular when viewed laterally, setiferous; femoral tubercle prominent, rounded; smooth area with rather close, slightly irregular striæ; limiting ridge strong; anterior tibiæ very strongly dilated; other parts as usual.

♀. Sutural tips slightly produced.

Hab.—Massachusetts (Cambridge), District of Columbia, Michigan (Port Huron).

Collections of Dr. Horn, Hubbard, Schwarz and the National Museum.

The sexes are more strongly differentiated than in any other species known to me. When males are at hand the strongly dilated front tibiæ will make this species easily recognizable among an otherwise difficult group.

10. **A. virile** n. sp.—Form narrow, entirely black; pubescence very sparse and fine, but quite evident in well-preserved specimens. Beak (♂) not very slender, shorter than the head and prothorax, moderately dilated, scarcely more slender beyond the dilation than at the base; surface finely strigose, scarcely visibly so toward the tip, which is shining; punctures fine and sparse. First joint of antennæ barely as long as the next two, second and third subequal in length, third evidently longer than the fourth. Front canaliculose; eyes not very prominent. Prothorax a little longer than wide; base very little wider than the apex; sides somewhat prominent at the middle; surface rather finely, not closely punctate; impressed line nearly complete. Elytra narrow, fully three-fourths longer than wide; humeri moderate, post-humeral sinuation feeble; sides feebly diverging to the middle. Beneath sparsely, finely punctate; legs moderate; claws with merely an obtuse angulation at the base. Length 2-2.3 mm.; .08-.09 inch.

♂. Sutural angles rounded; second antennal joint setiferous; femoral tubercle prominent, closely striate throughout its lateral face; anterior tibiæ rather abruptly but not strongly widened and parallel in apical two-thirds, mucro of middle and hind tibiæ minute; metasternal spicules small.

♀. Not seen.

Hab.—Colorado (Greeley).

Two males taken by Mr. Wickham.

11. **A. melanarium** Gerst.—Elongate, black, shining, sometimes with faint, æneous lustre; pubescence very sparse and inconspicuous. Beak (♂) scarcely as long as the head and prothorax, nearly cylindrical, moderately dilated, finely sculptured and punctulate, smoother toward the tip; (♀) longer and more arcuate, very slender, not dilated, smoother. First joint of antennæ subequal to the next two (♂), seldom as long, and never longer than the next three (♀). Front rather narrow, slightly depressed, canaliculose; eyes moderate. Prothorax longer than wide; sides very feebly diverging from apex to base, more or less prominent at the middle; surface rather finely, usually not very closely punctate; impressed line nearly or quite complete. Elytra narrow, nearly twice as long as wide, widest at the middle; humeri moderate, post-humeral sinuation evident; striæ moderate; intervals nearly flat, about twice as wide as the striæ. Beneath finely, sparsely punctate; legs slender; claws nearly simple. Length 1.7-2.2 mm.; .07-.09 inch. (Pl. II, figs. 7 and 22).

♂. Femoral tubercle very prominent; smooth area, not or scarcely striate; limiting ridge strong; sutural angles rounded; other characters as usual.

♀. Tips of elytra moderately produced.

Hab.—Massachusetts, Long Island, District of Columbia, Pennsylvania, Canada, Michigan, Illinois, Iowa, Kansas, Texas.

For the present I have placed here two or three small examples from Florida, which differ only in the absence of the femoral ridge. It is more than likely that they are distinct, but I am unwilling to separate them on this character alone without more abundant material. It is quite certain that Gerstaecker had before him a member of the present group, but as no sexual characters are mentioned his description applies about equally well to any one of several species. The locality named—North America—is a trifle too indefinite to offer any clew, but as his type is, without much doubt, from the Eastern United States, I have selected the above species as the one—all things considered—he is most likely to have had in hand.

As here defined, *melanarium* is one of a group of species so closely resembling one another superficially that in the absence of sexual characters their proper separation has hitherto been impossible. These are *melanarium*, *pennsylvanicum*, *impunctistriatum* and *virile* Of these, the first three are to be found in the Eastern United States. *Impunctistriatum* may always be known by the coarsely, densely punctate, ventral surface. Its range is also less northern and eastern than the other two; Northern Illinois and Western Pennsylvania being the limits so far as known in these directions. Both *melanarium* and *pennsylvanicum* are rather common in the Northeastern States, the former occurring westward to Iowa and Texas, and the latter extending entirely across the continent toward the northern boundary and down either coast to Florida and So. California. In *melanarium* the elytra are noticeably narrower, and the front thighs of the male are strongly tuberculate; while in *pennsylvanicum*, with more ample elytra, the front thighs of the males are merely swollen toward the tip. Unless accompanied by males, the separation of the females is a difficult matter, even to the experienced student. I have never noticed in *melanarium* that extreme development of the beak and first antennal joint which is not infrequently seen in *pennsylvanicum*. *Virile* nearly agrees with *melanarium* in the prominent femoral tubercle, which is here, however, closely, plainly striate, while in *melanarium* it is smooth and not, or scarcely visibly, striate. It occurs in Colorado.

12. **A. floridanum** Smith.—Very narrow, black, legs and antennæ dark rufous; pubescence very inconspicuous. Beak (♂) rather stout, cylindrical, evidently shorter than the head and prothorax, very slightly dilated; surface dull at base, gradually more shining toward the tip, very obsoletely punctulate. First antennal joint equal to the next two, second scarcely reaching the eye. Front canaliculate; eyes rather prominent. Prothorax longer than wide, cylindrical;

sides feebly, arcuately, prominent at the middle; surface sparsely, finely punctate; impressed line not complete. Elytra very narrow, twice as long as wide; humeri small but evident; sides diverging very feebly to behind the middle; striæ moderately fine, obsoletely punctate: intervals flat. Punctuation beneath, exceedingly fine and sparse. Length 2 mm.; .08 inch.

♂. Sutural angles somewhat rounded; femoral tubercle prominent; smooth area rather strongly striate inferiorly; limiting ridge feeble; tibial armature minute: other characters as usual.

♀. Not seen.

Hab. —Florida (Capron).

The unique type is a male in the National Museum collection. It is nearest *desolatum* in general appearance, but differs by the evident humeri and stronger, striate, femoral tubercle. The unusually stout beak for this section, and the very narrow elytra, which are widest behind the middle, should make this species easily recognizable. Specimens will probably occur with the legs entirely piceous or black.

13. **A. robustum** Smith.—Similar in form to *melanarium*, or a little stouter; entirely black, not very shining and not at all metallic; pubescence fine and sparse. Beak (♂) as long as the head and prothorax, moderately dilated, finely sculptured, except at tip, obviously punctate; (♀) longer, more slender and more strongly curved not dilated. First antennal joint equal to the two (♂), or three (♀) following, third joint reaching the eye. Front canaliculose; eyes moderate. Prothorax of the usual shape; punctuation moderately fine and close; impressed line nearly complete. Elytra widest at the middle; humeri well developed; striæ rather fine; intervals about three times as wide as the striæ upon the disc. Beneath sparsely, finely punctate. Length 2.5 mm.; .10 inch.

♂. Femoral tubercle prominent: lateral surface flat, obscurely striate: inferior surface nearly flat and meeting the lateral surface at an angle, limiting ridge entirely wanting; other characters as usual.

♀. Sutural angles not rounded, tips of elytra conjointly produced.

Hab.—Missouri, Texas, Iowa, Illinois, Michigan (Smith).

A specimen in the National Museum collection is labelled Mass. The correctness of the label may be doubted. The female was originally described by Smith under the name *obesum*, but was subsequently (Ent. Am. III, p. 56) properly referred by him.

14. **A. obsoletum** Smith.—Elongate, entirely black, or with the legs brownish, not very shining and without metallic lustre; pubescence very inconspicuous. Beak (♂) as long as the head and prothorax, moderately slender, not strongly arcuate, quite abruptly dilated; surface dull, except toward the tip; punctuation sparse; (♀) longer and a little more slender, not dilated. Front more or less canaliculate; eyes rather small, not very prominent. Prothorax longer than wide; sides very feebly diverging, slightly prominent at the middle, punctuation rather close; impressed line complete. Elytra elongate oval, nearly

twice as long as wide; humeri wanting; striæ rather deep; intervals flat or slightly convex, about twice as wide as the striæ. Beneath rather sparsely punctate; claws simple. Length 2.2-2.4 mm.; .09-.10 inch.

♂. Femoral tubercle prominent; smooth area not or scarcely visibly striate; limiting ridge well marked; other characters as usual.

♀. Sutural tips moderately produced.

Hab.—Dakota, Nebraska, Missouri, Michigan.

Smith also gives Canada and California. The California specimens were considered by him as identical with *ovale*, which is now known to be the female of *obsoletum;* they are, however, without doubt, *hesperum*, females of which are scarcely distinguishable from those of the present species, though the males are readily separated.

15. **A. ellipticum** Smith.—Moderately elongate, entirely black; pubescence sparse, but evident in well-preserved examples. Beak a little longer in the ♀, but shorter than the head and prothorax in both sexes; stout at the base, much more slender, cylindrical, entirely polished and finely, sparsely punctulate beyond the rather strong dilatation, which is present in both sexes. Antennæ rather stout; first joint scarcely as long as the next two, third and fourth equal, second reaching the eye. Front wide, canaliculate; eyes rather large, prominent. Prothorax nearly cylindrical, very slightly longer than wide; sides just visibly arcuate at the middle; surface rather closely punctate; impressed line complete. Elytra about twice as wide as the prothorax, two thirds longer than wide, a little wider at the middle; humeri moderate; sides nearly parallel, feebly, evenly arcuate; striæ moderate, not strongly punctate; intervals flat, not more than twice as wide as the striæ on the disc. Beneath rather numerously but not very closely punctate. Legs rather short and strong for this section; claws nearly simple. Length 1.7 mm.; .07 inch.

♂. Anterior femora merely swollen, compresso-carinate beneath without well-defined groove and ridge; smooth area with coarse, rather distant striæ; tibial armature more strongly developed than is usual in this section; other characters as usual.

♀. Elytral tips slightly prolonged.

Hab.—Louisana, Nebraska, Texas.

The rostral and sexual characters abundantly distinguish this species from any other in our fauna.

16. **A. desolatum** Smith.—Elongate, black; legs rufous, indistinctly pubescent. Beak (♂) rather stout, shorter than the head and prothorax, nearly cylindrical, moderately dilated, only slightly more slender beyond the dilatation, strigose almost to the apex; punctuation sparse but evident; (♀) longer, slender, strongly arcuate, smoother and more shining. First joint of antennæ subequal to the next two, second reaching the eye. Front longitudinally rugulose or canaliculate; eyes moderately prominent. Prothorax cylindrical, a little longer than wide; sides slightly arcuately prominent at the middle; surface rather sparsely, finely punctate; dorsal line feebly impressed, somewhat variable, not complete. Elytra ovate; humeri wanting; striæ rather deep; intervals convex. Beneath sparsely, finely punctate; legs not slender; claws nearly simple. Length 1.6 mm.; .06 inch. (Pl. II. fig. 8).

♂. Anterior femora merely swollen; smooth area not striate; limiting ridge evident; tibial armature minute; other characters as usual.

♀. Elytra prolonged at tip.

Hab.—Georgia, Florida.

Three males and one female are before me, agreeing in all essential characters; I cannot, however, be absolutely sure that the female is properly referred, the male is therefore to be regarded as the type.

17. **A. sinuirostrum** n. sp.—Elongate, black, with or without æneous lustre; pubescence fine, sparse. Beak (♂) as long, (♀) noticeably longer than the head and prothorax, stouter at the base, more slender, nearly cylindrical, polished and subimpunctate beyond the insertion of the antennæ. When viewed in profile the base, beginning at the insertion of the antennæ, is flattened or even slightly concave above. Antennæ about as usual; the first joint scarcely as long as the next two (♂), or fully as long (♀). Front moderately wide, longitudinally rugulose; eyes moderate. Prothorax cylindrical, rather more longitudinally convex than usual; sides arcuately prominent at the middle; surface rather sparsely punctate; impressed line more or less imperfect. Elytra rather strongly longitudinally convex; humeri nearly wanting; sides divergent to the middle; striæ moderate; intervals flat or slightly convex. Beneath sparsely punctate; legs rather slender; claws nearly simple. Length 1.7 mm.; .06 inch. (Pl. II, fig. 21).

♂. Front thighs merely swollen; smooth area not noticeably striate; other characters as usual.

♀. Tips of elytra scarcely produced.

Hab.—Florida (Lake Ashby).

Several examples collected by Mr. Schwarz or Mr. Hubbard. The form of the beak is unique and sufficient to distinguish this species from any of the related forms.

18. **A. molestum** n. sp.—Moderately elongate, black, moderately shining, without æneous lustre; pubescence nearly wanting. Beak (♂) shorter than the head and prothorax, dilated at one-third from the base, more slender and feebly attenuate beyond the dilatation; punctuation sparse, fine; polished and nearly impunctate in apical third; (♀) longer than the head and thorax, very slender, not dilated, strongly, evenly arcuate, obsoletely punctulate; the finer sculpture extending to or a little beyond the middle. Antennæ brown, first joint equal to (♂), or a little longer than (♀) the next two. Front canaliculate; eyes prominent. Prothorax a little longer than wide; apex nearly as wide as the base; sides slightly prominent at the middle; surface rather coarsely and closely punctate; impressed line complete. Elytra moderately, longitudinally convex, widest at or a little behind the middle; humeri wanting or but faintly indicated; striæ deep; intervals more or less convex, especially toward the base. Abdomen rather coarsely, not sparsely punctate. Length 1.6 mm.; .06 inch.

♂. Front thighs merely swollen; smooth area not striate; one or two striæ adjacent to the limiting ridge, which is well marked; sutural angles rounded; other characters as usual in the group.

♀. Sutural angles scarcely rounded, somewhat produced.

Hab.—Illinois (Liebeck).

19. **A minutum** Smith.—Entirely black; pubescence indistinct. Beak (♂) about as long as the head and prothorax, stouter at the base, more slender and slightly tapering beyond the dilatation; finely sculptured in basal half, thence polished to the tip; punctuation fine and sparse; (♀) a little longer, very slender, not dilated. Antennæ as usual. Front longitudinally rugulose; eyes moderate. Prothorax subcylindrical, very little longer than wide; base a little wider than the apex; sides moderately prominent at the middle; surface usually sparsely punctate with nearly complete dorsal line. Elytra rather short, strongly, longitudinally convex; humeri small; sides divergent, rather more strongly than usual, widest at the middle; striæ moderate; intervals nearly flat or feebly convex. Beneath sparsely punctate. Length 1.5-1.8 mm.; .06-.07 inch.

♂. Front thighs merely swollen; smooth area with, at most, a few very fine striæ; limiting ridge evident; other characters as usual in the group.

♀. Tips of elytra produced.

Hab.—Georgia, Florida.

20. **A. texanum** Smith.—Closely allied to the preceding, and differing as follows: The beak (♂) is distinctly shorter than the head and prothorax. The elytra are narrower and less longitudinally convex; the humeri relatively a little more prominent; the abdomen more strongly and numerously punctate. The legs are a trifle more slender. This is the smallest species of the section, and should be separated without difficulty by the above characters. Length 1.3-1.5 mm.; .05-.06 inch.

All specimens seen are from Texas, and nearly all from Columbus, where it was taken many years ago by Mr. Schwarz.

21. **A. pennsylvanicum** Boh.—Entirely black, with or without faint, æneous lustre; pubescence very sparse and inconspicuous. Beak (♂) about as long as the head and prothorax, dilated, noticeably stouter at base than beyond the dilatation; polished in about the apical half, and finely, sparsely punctulate; (♀) more elongate and slender, not dilated. First joint of antennæ as long as the next two (♂), or three (♀), second joint reaching the eye. Front rather wide, canaliculose; eyes moderate. Prothorax as long or a little longer than wide, subcylindrical; base a little wider than the apex; sides with the usual median prominence; surface variably punctate, usually moderately, closely, but sometimes quite sparsely; impressed line complete or not. Elytra rather strongly widening to the middle; humeri moderate or small; striæ well impressed; intervals moderately wide, flat or slightly convex. Beneath sparsely, finely punctate. Length 2. mm.; .08 inch. (Pl. II, figs. 9 and 24).

♂. Front thighs merely swollen; smooth area not striate; limiting ridge evident; other characters as usual.

♀. Elytral tips more or less strongly produced.

Occurs from Florida to the New England States, thence westward to Washington and down the Pacific Coast to Southern California.

Examples from the west coast are, as a rule, a little less shining and with less developed humeri; the differences are, however, small and evanescent. The beak is sometimes very much elongated in the female, and the first antennal joint in such cases becomes even

longer than the three following. I am quite confident that this is Boheman's species, but only a reference to the type can settle the matter with certainty.

22. **A. funereum** n. sp.—Elongate, black, opaque; pubescence almost wanting. Beak (♂) somewhat shorter than the head and prothorax, rather slender, not strongly curved, moderately dilated, finely sculptured and opaque almost throughout; punctuation rather fine and sparse. Antennæ piceous brown; first joint about equal to the next two, second rather slender, reaching the eye. Front somewhat depressed, canaliculate; eyes moderate. Prothorax cylindrical, evidently longer than wide; base just visibly wider than the apex; sides nearly straight; punctuation rather strong and close; impressed line nearly complete. Elytra narrow, subparallel; humeri moderate; striæ well impressed, rather closely punctate; intervals flat or slightly convex, about twice as wide as the striæ on the disc. Beneath rather closely and coarsely punctate; legs slender; first joint of tarsi more elongate than usual, being more than twice as long as wide; claws with a small but evident tooth. Length 2.2 mm.; .09 inch. (Pl. II, fig. 20).

♂. Anterior thighs scarcely swollen; smooth area limited to the inferior groove which is not striate. Front tibiæ very feebly widened; middle tibia with a small mucro; hind tibia scarcely visibly armed; other characters as usual in the group.

♀. Beak not longer than the head and thorax, slender, strongly arcuate, polished in apical fourth; tips of elytra scarcely produced.

Hab.—Oregon, California, Washington (Camp Umatilla).

The opaque surface, parallel form and sexual characters render this a very distinct species. The front thighs of the male are just visibly enlarged, but so feebly that it might readily escape observation. The armature of the hind tibiæ is, as a rule, feebler than that of the middle tibiæ, but the mucro is here exceptionally minute.

23. **A. occidentale** n. sp.—Elongate, black; legs usually piceous brown; not very shining and with never any metallic lustre; pubescence very sparse but evident. Beak not very slender, rather feebly arcuate, a little shorter than the head and prothorax, nearly cylindrical, moderately dilated (♂); longer, scarcely dilated (♀); finely strigose nearly to the tip; punctuation fine, sparse. Antennæ with first joint equal to the next two (♂), or three (♀), third joint reaching the eye. Front canaliculose; eyes not prominent. Prothorax notably longer than wide, subcylindrical; base plainly wider than the apex; sides slightly prominent at the middle, moderately closely punctate; impressed line nearly complete. Elytra narrow; humeri rather strong; sides feebly arcuate; intervals flat, about twice as wide as the striæ on the disc. Beneath sparsely, rather finely punctate. Legs slender; claws nearly simple. Length 2.2-2.4 mm.; .09–.10 inch. (Pl. II, figs. 10 and 25).

♂. Front thighs scarcely visibly enlarged; smooth area almost entirely inferior, very finely, not closely striate; limiting ridge present; front tibiæ only slightly widened; other characters as usual.

♀. Tips of elytra more or less produced.

Hab.—Kansas, Nebraska, Texas, Colorado, Utah, Arizona, Oregon, California.

This appears to be a tolerably abundant species throughout the arid and semi-arid regions, both east and west of the Rocky Mountains. It has not yet occurred in the true Pacific fauna. Well-preserved specimens are more noticeably pubescent than any other species of the group.

24. **A. hesperum** n. sp.—The preceding description applies so perfectly to this species, that it is only necessary to note the points of divergence. The humeri are here almost entirely wanting, whereas in *occidentale* they are unusually prominent for this section. *Hesperum* is almost perfectly apterous, the wing being reduced to a slender, parallel fillet, less than half as long as the elytra, and about one-fifth as wide as long. The legs are black in all the specimens I have seen. (Pl. II, fig. 23).

Sixteen examples are before me, all taken in Southern California (Los Angeles Co.), by Mr. Coquillet.

II.

The species here aggregated include all those which, with simple or nearly simple claws, lack the peculiar sexual modifications of the anterior femora, which characterize the previous series. Taken as a whole they form a far less homogeneous group than the preceding, certain species indeed exhibiting affinities so divergent as to awaken doubts as to the taxonomic value of ungual formation as a primary point of departure.

There will be found in this section a gradual change from the absoluely simple to the feebly angulate or subdental claw. Thus in *reclusum*, *punctinasum*, *curticorne* and *sordidum* the claws are almost perfectly simple; in *perminutum*, *tenuiforme* and *acrophilum* they become subangulate at base, while in *antennatum* and *œdorhynchum* there is present an evident, though usually very inconspicuous tooth; these last two leading naturally to the next section. See Pl. III, figs. 13, 14 and 15.

Aside from the usual, more or less evident disparity in the rostrum, sexual differences are generally pronounced; two species only—*reclusum* and *acrophilum*—having the male tibiæ mucronate.

Perminutum is, on the whole, decidedly aberrant; it may be at once known from any other species in our fauna by the depressed form, peculiar coloration and antennæ inserted close to the eyes. Were it not for the form of the claws *tenuiforme* would certainly be placed in Section IV, which contains all the other species having the tarsi spined in the male.

The species easily separate, as follows:

Antennæ inserted very near the base; legs and beak pale..25. **perminutum.**
Antennæ less basal, species entirely black.
Pubescence almost entirely wanting.....3.
Pubescence moderately abundant.
First joint of middle tarsi of ♂ with a strong spiniform process on the inner side.....2.
Middle tarsi of ♂ not modified.
Beak moderately long, metasternum tuberculate.....1.
Beak short, stout; metasternum not tuberculate.
Form stout, prothorax widest behind the middle, slightly constricted before the base; pubescence consisting of sparsely-placed squamiform hairs.....26. **reclusum.**
Form elongate, prothorax parallel in basal half; pubescence plentiful, fine, condensed at the bases of the third elytral intervals and in a post-scutellar spot.....27. **punctinasum.**
1. Humeri well developed: metasternum longer than the first ventral segment; third joint of antennæ not reaching the eye.....28. **curticorne.**
Humeri variable, usually small or wanting; metasternum shorter than the first ventral; second or third joint of antennæ reaching the eye.
29. **sordidum.**
2. Humeri moderate; form narrow; middle femora of ♂ incrassate.
30. **tenuiforme.**
3. Beak stout, feebly arcuate.
Prothorax wider behind; elytral striæ deeper; intervals narrower.
31. **acrophilum.**
Prothorax small; sides subparallel; striæ less deep; intervals wide.
32. **antennatum.**
Beak slender, strongly arcuate.....33. **œdorhynchum.**

25. **A. perminutum** Smith.—Depressed, black; legs, antennæ, beak and tips of elytra yellowish or rufous; pubescence very sparse and inconspicuous. Beak shorter than the head and prothorax, nearly straight, slender, cylindrical, very finely strigose toward the base, impunctate, more or less shining. Antennæ inserted close to the base, short, outer joints transverse, first but slightly longer than the second and reaching the eye. Front rather narrow, with two more or less distinct rows of punctures; eyes prominent. Prothorax wider than long; both apical and basal constrictions strong, widest behind the middle; punctures rather coarse, sparse and unevenly distributed; basal fovea large but not deep. Elytra subparallel; humeri moderate; striæ shallow; intervals rather wide, slightly convex. Beneath sparsely, finely punctate; claws nearly simple. Length 1.2-1.4 mm.; .05-.06 inch. (Pl. III, figs. 1 and 1*a*).

Hab.—Massachusetts, Delaware, District of Columbia, Virginia, Georgia, Florida, Texas.

Widely distributed, but apparently rather scarce. An exceedingly isolated form, and one which is more or less out of line wherever placed. The antennæ are inserted nearer to the eyes than in any species known to me. There can hardly be a doubt that in the fourteen examples before me both sexes are represented, but I am

quite unable to distinguish them. There is no sign in any of them of a deflection of the tip of the abdomen, which, in the vast majority of species, enables one to select the males regardless of any special sexual character.

26. **A. reclusum** n. sp.—Robust, black, somewhat shining; pubescence sparse. Beak very stout, as long as the prothorax (♂), slightly longer and a trifle less stout (♀), dilated, sparsely, finely punctate above, more closely and coarsely at the sides; tip shining; supra antennal groove and puncture well marked. First joint of antennæ subequal to the two following, second about reaching the eye. Front wide, punctate and deeply sulcate; eyes not prominent. Prothorax large, transverse; apical constriction scarcely evident; sides divergent to about one-fourth from the base, thence convergent; basal margin slightly expanded, width in front of the base a little greater than at the base; punctuation coarse and moderately close; basal impressed line reaching the middle or nearly so. Elytra ovate, widest behind the middle; humeri small; intervals wide; feebly convex on the disc; more strongly at the side. Beneath sparsely punctate; meso and metasternal side pieces clothed with closely-placed, white, scale-like hairs. Legs not strong, slightly rufescent; claws almost perfectly simple. Length 2.2 mm.; .09 inch. (Pl. III, figs. 2 and 2*a*).

♂. Middle and hind tibiæ armed with a rather small mucro.

♀. Tibiæ unarmed.

Hab.—District of Columbia, New Jersey (Anglesea—Liebeck).

The sutural angles of the elytra are a little more rounded in the male, but the difference is not conspicuous.

27. **A. punctinasum** Smith.—Elongate, black; pubescence plentiful, conspicuously condensed at the bases of the third elytral intervals and in a post-scutellar spot. Beak very short, scarcely as long as the prothorax (♂), a little longer (♀), feebly dilated, punctate throughout, the punctures only slightly denser and stronger at the sides; tip polished. First joint of antennæ short, though nearly equal to the two following, third joint barely or not reaching the eye. Front punctate, not sulcate; eyes small, not at all prominent. Prothorax subcylindrical; base not much wider than the apex, a little longer than wide; apical constriction not well marked; sides feebly divergent to the middle, thence nearly parallel to the base; basal margin not expanded; surface rather densely, finely punctate, sometimes with an imperfect, median, impunctate line; basal fovea small but strong. Elytra fully one-half longer than wide, widest behind the middle; humeri not large; intervals nearly twice as wide as the striæ, plane or very slightly convex. Beneath rather closely, but not coarsely punctate; claws simple. Length 2-2.6 mm.; .08-.10 inch. (Pl. III, figs. 3 and 3*a*).

Hab.—Wyoming (Dr. Horn), Nevada (Wickham), British Columbia (Liebeck).

No sexual differences other than the slightly longer beak of the female have been noticed. The elytra are faintly æneous in some specimens. The condensation of the pubescence at the bases of the third elytral intervals is more or less noticeable in many species;

the post-scutellar patch, however, occurs very rarely. The three form the vertices of an equilateral triangle, which is quite conspicuous in well-preserved specimens.

28. **A. curticorne** n. sp.—Black, rather sparsely pubescent. Beak strong, cylindrical, as long as the head and prothorax (♂), noticeably longer (♀), punctures strong, rather coarse, and more numerous at the sides; tip polished. First joint of antennæ short, barely equal to the next two, second, third and fourth subequal, third not reaching the eye (♂), fourth scarcely so (♀). Front a little wider than the tip of the beak, not sulcate, with two rows of punctures bearing scale-like hairs; eyes moderate, not prominent. Prothorax a little wider than long; apical constriction well marked; sides nearly parallel in basal three-fifths; posterior sinuation scarcely evident; surface rather coarsely, not closely punctate; basal fovea small, punctiform. Elytra about one-half longer than wide, widest at the middle; humeri moderate; intervals rather wide, convex; punctuation beneath rather coarse, not very close. Length 2.4 mm.; .096 inch. (Pl. III, figs. 4 and 4a).

♂. Sutural angles rounded.

♀. Sutural angles not rounded.

Described from a single pair, the male collected by Mr. Schwarz in Southern Texas (San Diego), and now in the collection of the U. S. Department of Agriculture; the female in my own collection from Texas without definite locality. The metasternum bears near the middle of the posterior margin an obtuse tubercle, which is not in the least emarginate at the summit, or geminate, as is the case in *sordidum*. Certainly very closely related to the following species, but apparently distinct by the characters mentioned in the table, also by the larger prothorax, stouter beak, and the less basally inserted antennæ.

29. **A. sordidum** Smith.—Form variable, black, never in the least æneous; pubescence sparse, generally more or less squamiform. Beak cylindrical, not appreciably dilated, subequal to the head and prothorax (♂), or somewhat longer (♀), usually quite strongly punctate, especially at the sides, where the punctures tend to arrange themselves in series; surface alutaceous as far as the insertion of the antennæ, apically polished, or at least shining to a variable extent. Front narrow, scarcely wider than the tip of the beak, not sulcate, but with two conspicuous lines of strong punctures, which are occasionally subconfluent; eyes moderately or not at all prominent. Basal joint of antennæ equal to or a little shorter than the two following, third joint visibly longer than the fourth, second or third reaching the eye. Prothorax usually a little wider than long; base only very slightly wider than the apex; sides subparallel; surface closely punctate with small basal fovea. Elytra more or less ventricose; humeri varying from nearly wanting, to a moderate development; sides rather strongly diverging to a little behind the middle; striæ deep, grossly punctate; intervals convex, narrow or moderately wide. Beneath rather coarsely, but not closely punctate; metasternum with a geminate tubercle near the posterior margin; legs not stout;

last tarsal joint long, projecting beyond the lobes of the third joint for a greater distance than their length. Length 1.6-2.2 mm.; .06-.09 inch. (Pl. III, figs. 6, 6*a* and 7).

♂. Sutural angles of elytra broadly rounded.

♀. Sutural angles scarcely rounded.

Hab.—Utah, Arizona, California (San Francisco to San Diego).

An exceedingly variable insect, unless, perchance, I have confused two or more species in the aggregate above described. In the series of nearly one hundred examples before me I am, however, quite unable to find any group of characters of sufficient constancy to warrant a subdivision. As the variations are, to a considerable extent, geographical, it would be well to indicate the prevailing form in the regions above named; but it is to be remembered that from one locality or another intermediates are present, which more or less perfectly connect the extremes along any line of variation. In general, specimens from the more northern regions have the humeri small or entirely wanting. In these the metasternum is obviously shorter than the first ventral, and the wings are extremely rudimentary. In the prevailing form from Southern California and Arizona the humeri are quite well developed; the metasternum is nearly as long as the first ventral, and the wings are correspondingly more ample. In the Utah and Arizona examples the vestiture is more squamiform, the size smaller, the eyes less prominent than in those from California. The sides of the thorax are generally nearly parallel, but in a series from Phœnix, Arizona, the apical and basal constrictions are well marked. The elytra are generally widest behind the middle, but may be widest at the middle, with the sides regularly arcuate (Utah). In one example from California the legs and antennæ are rufous.

Var. *californicum* Smith.—I have retained this name for a somewhat strongly marked form from the region about San Francisco. It agrees with the Utah examples in the lack of humeri, but is considerably larger and more elongate, with less deeply impressed striæ and flatter intervals. The last tarsal joint is less elongate, projecting beyond the lobes of the third for a distance which is scarcely equal to their length. (Pl. III, figs. 8 and 8*a*).

Specimens in Dr. Horn's collection, bearing Smith's label, are before me and are identical with typical examples of *vespertinum* kindly sent me by Captain Casey. In case of subsequent division the form from Utah, described by Prof. Smith, will, of course, remain the type of the species. The original specimens were bred "from galls on *Artemisia*," and it should be said that the color, and

to some extent the form as originally described, were due to immaturity. Subsequently specimens were obtained at Lancaster (Los Angeles Co.), California, by Mr. Koebele, both from cecidomyid and dipterousgal ls on *Artemisia californica.*

30. **A. tenuiforme** n. sp.—Very narrow, black, sparsely pubescent. Beak about as long as the head and prothorax, not slender, rather strongly arcuate, scarcely dilated, finely sculptured nearly to the tip; punctuation sparse, fine, a little stronger at the side. Antennæ short, first joint equal to the next two, second reaching the eye, outer joints transverse. Front punctate, not sulcate; eyes moderate. Prothorax about as long as wide, widest a little before the base; sides parallel for a short distance at the apex, thence feebly arcuate to the base, which is a little wider than the apex; surface rather sparsely, but strongly, not coarsely punctate; a short impressed line at the base. Elytra parallel, about twice as long as wide; humeri small; striæ not deeply impressed; intervals somewhat convex. Punctures beneath deep but not close. Length 1.5 mm.; .06 inch. (Pl. III, figs. 5 and 5a).

♂. Sutural angles rounded; intermediate femora stouter; first joint of middle tarsi spined.

♀. Sutural angles not rounded; femora and tarsi unmodified.

Hab.—Florida.

Collections of Mr. Schwarz and National Museum. This species would perhaps more appropriately be placed with those showing like sexual characters, and is only retained here because of the simple claws.

31. **A. acrophilum** n. sp.—Black; pubescence very short, fine and sparse. Beak (♂) rather stout, scarcely as long as the head and prothorax, nearly cylindrical, feebly dilated at the middle, finely sculptured nearly to the tip; punctuation close and rather coarse at the sides, finer and less close above; apex shining; (♀) a little longer dilatation post-median, tip somewhat expanded, otherwise in the male. Antennæ inserted at the middle (♂), or a little more basal (♀), first joint but little longer than the second, shorter than the next two, fourth reaching the eye. Front punctate and canaliculose at the middle; eyes not very prominent. Prothorax transverse; sides divergent to the middle, then parallel to the base; apical constriction small; surface dull, densely punctate, with a linear basal fovea. Elytra about one-half longer than wide, widest near the middle; humeri moderate; post-humeral sinuation small; intervals not wide, nearly flat. Beneath deeply, densely punctate. Legs not stout; claws obtusely swollen at base. Length 2.1-2.3 mm.; .08 .09 inch. (Pl. III, fig. 12).

♂. Sutural angles rounded; all the tibiæ feebly mucronate.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—Colorado (Garland).

Collections of Dr. Horn, Mr. Schwarz and Mr. Bowditch. This species closely resembles *cribricolle,* and would certainly be placed next to it were it not for the simple claws. Aside from this, *acrophilum* differs by its longer beak, with the antennæ inserted at a

greater distance from the base, the somewhat larger thorax, lack of æneous lustre and mucronate hind tibiæ.

32. **A. antennatum** Smith.—Moderately elongate, black, not shining; pubescence almost wanting. Beak shorter than (♂), or about as long (♀) as the head and prothorax, stout, cylindrical, scarcely, or at most, feebly dilated; tip slightly expanded when the dilatation is marked; surface dull, punctate throughout; the apex more or less shining. Antennæ inserted a little behind the middle, first joint shorter than the two following united, third reaching the eye. Front punctate and more or less canaliculose; eyes small but rather prominent. Prothorax small, somewhat variable in shape, usually as wide as long; sides feebly diverging from apex to base, the divergence a little stronger, as a rule, in the apical half, densely, rather coarsely punctate, with a foveate line at the base. Elytra at base one-half wider than the thorax, about one-half longer than wide, widest a little behind the middle; post-humeral sinuation obvious; intervals nearly flat, about twice as wide as the striæ. Beneath coarsely, densely punctate; legs thin; claws with an inconspicuous tooth. Length 1.8-2.2 mm.; .07-.09 inch. (Pl. III, fig. 10).

♂. Sutural angles rounded.

♀. Sutural angles not rounded.

An abundant and widely diffused species on the west coast, occurring from Vancouver to Southern California; also in Nevada (Elko) Wickham.

33. **A. œdorhynchum** Lec.—Black, legs sometimes rufopiceous, very sparsely, finely, inconspicuously pubescent. Beak as long as the head and prothorax (♀), a little shorter (♂), strongly curved, thicker at the base, slender beyond the insertion of the antennæ, strigose, except in apical third or fourth, which is more or less polished; punctuation fine, sparse. Antennæ slender, outer joints not transverse, first shorter than the two following, second reaching the eye. Front canaliculose; eyes not prominent. Prothorax a little wider than long; sides slightly diverging from apex to base, with a more or less noticeable post-apical and ante-basal constriction, which leaves the sides slightly arcuate and prominent in middle half or two-thirds; surface closely, but not coarsely punctate; an impressed line of varying length, but usually extending to or a little in front of the middle. Elytra fully twice as wide as the prothorax, about one-half longer than wide, widest at the middle; humeri strong; intervals nearly flat, scarcely twice as wide as the striæ; punctuation beneath moderately strong and close on the first two ventrals and at the sides of the metasternum. Legs thin; claws angulate, or with a very inconspicuous tooth at the base. Length 1.5-2.2 mm.; .06 .09 inch. (Pl. III, fig. 9).

♂. Sutural angles rounded.

♀. Sutural angles distinct.

Hab.—Southern California, Catalina Island, Arizona, Montana.

This is an abundant species in Southern California, and has been taken in some numbers in the Pinal Mountains of Arizona by Mr. Wickham. A single female collected by Mr. Schwarz at Bear Paw Mountain represents the last locality named. There is very little

variation aside from size and color of the legs. *Œdorhynchum* in some respects resembles certain species of Section I, but the likeness is merely superficial. There is not the least indication of any of the characters which are peculiar to that group. The intromittent organ of the male is flattened and acuminate at the tip as in the following sections—not cylindrical and rounded as in Section I.

III.

The species here included are a little more numerous than the two preceding groups combined. They agree in having the claws plainly, usually strongly toothed at the base (Pl. IV, fig. 4), and at least two pairs of tibiæ mucronate in the male. In by far the greater number the middle and hind tibiæ are thus armed; in two only—*opacicolle* and *cribricolle*—it is the front and middle tibiæ; while in six species—*tenuirostrum, cordatum, oblitum, furtivum, commodum* and *confertum*—all three pairs are mucronate. The mucro of the anterior pair when present is always small, and sometimes so minute as to easily escape notice. In a considerable number of species the mucro of the middle and hind tibiæ is subangulate or dentate beneath. The degree and position of the angulation or denticle seems very constant for each species, and doubtless might, within limits, be used to greater advantage by the careful observer than I have deemed it advisable to do. With but two or three exceptions the species are at least moderately robust, the thorax more or less transverse, wider behind, with a basal fovea; humeri well developed; body plainly pubescent.

The species known to me may be distinguished as follows:

Prothorax slender; sides nearly parallel—at least in the ♂; base but little wider than the apex.....1.

Sides of thorax not parallel; base usually much wider than the apex.....2.

1. First joint of antennæ shorter than the next two; anterior coxæ of ♂ not tuberculate.....34. **opacicolle.**

   First joint of antennæ as long as the next two (♂), or three (♀); anterior coxæ (♂) tuberculate at the apex.....35. **coxale.**

2. Prothorax widest before the base; sides not at all sinuate posteriorly. (Pl. IV, fig. 1).....3.

   Prothorax variable, often with a slight sinuation before the base, which is never narrower than the middle. (Pl. IV, fig. 2).....4.

   Prothorax with the sides plainly narrowed behind the middle, which is as wide or even wider than the base; size large, 2 mm. or more, except *furtivum*. (Pl. IV, fig. 3).....11.

3. All the tibiæ of the ♂ mucronate; elytral intervals convex.

   36. **tenuirostrum.**

Middle and hind tibiæ of ♂ mucronate; elytral intervals flat or nearly so.
First joint of antennæ pale; tibiæ and base of femora rufous.
37. **æneipenne.**
Antennæ and legs entirely dark.
Vestiture rather dense, squamiform.....38. **impexum.**
Vestiture not dense, hair-like.
Body less robust; prothorax much wider than long.....39. **metallicum.**
Body more robust; prothorax very little wider than long. 40. **troglodytes.**
4. Beak short, stout.....10.
Beak more slender—at least moderately long.....5.
5. Front narrower than the tip of the beak.....9.
Front not narrower, usually obviously wider than the tip of the beak.
Antennæ inserted very near the base of the beak, first joint nearly or quite reaching the eye.
Vestiture abundant, subsquamiform; beak slender.
Elytra scarcely one-third longer than wide...41. **propinquicorne**
Elytra about one-half longer than wide.....42. **modestum.**
Vestiture finer, sparser; beak stouter.
Surface with reddish bronze lustre; prothorax rather sparsely punctate.
43. **subtinctum.**
Surface black, sometimes slightly æneous; prothorax moderately, closely punctured.....44. **pervicax.**
Antennæ less basal, first joint not reaching the eye.
Head beneath as usual; tibial armature well developed.....6.
Head excavated and polished beneath; tibial armature feeble. 45. **gulare.**
6. Tibial mucro with a more or less conspicuous denticle on the under side.
First joint of antennæ longer than the next two; tibial mucro long.
46. **proclive.**
First joint of antennæ shorter than the next two; tibial mucro short.
47. **chuparosæ.**
First joint of antennæ barely as long as the next two; intervals of elytra more or less convex.
Tibial mucro moderately long with an acute denticle beneath; beak and abdomen more coarsely punctate; first antennal joint nearly reaching the eye.....48. **grossulum.**
Tibial mucro shorter; denticle less acute, subapical; beak and abdomen less coarsely punctate; second antennal joint reaching the eye.
49. **patruele.**
Tibial mucro simple, or at most subangulate beneath.
Form elongate, wider behind; beak parallel, feebly arcuate, much longer in the ♀; third joint of antennæ reaching the eye (♀); body beneath more sparsely punctate than usual.....50. **walshii.**
Form moderately stout; second joint of antennæ usually reaching the eye in both sexes; punctuation beneath closer.
First joint of antennæ subequal to the next two.....7.
First joint of antennæ obviously shorter than the next two, at least in the ♂.
Tibial mucro short, more or less subangulate beneath.
Elytral intervals very little wider than the striæ; body ventricose.
51. **abdominale.**
Elytral intervals wider; body oblong.....52. **perforicolle.**

Tibial mucro long, simple; intervals much wider than the striæ.
Less elongate; beak feebly attenuate; tibial mucro projecting at an angle with the tibia.....53. **novellum.**
More elongate; beak distinctly attenuate; tibial mucro projecting in line with the tibia.....54. **nebraskense.**
7. Punctuation beneath not conspicuously coarse.....8.
Metasternum and abdomen very coarsely, deeply punctured...55. **minor.**
8. Pubescence sparse.
Elytral intervals flatter; hairs beneath less scale-like: surface usually with æneous lustre; strial punctures finer; superior margin of antennal fovea not angulate.....56. **turbulentum.**
Elytral intervals noticeably convex; vestiture beneath decidedly squamiform; surface without æneous lustre; strial punctures coarser; superior margin of antennal fovea angulate.....57. **importunum.**
Pubescence conspicuous.
Tibial mucro long, acute; beak (♀) slender, finely sculptured.
Intervals flat; surface frequently æneous.....58. **griseum.**
Intervals moderately convex; surface never æneous....59. **æquabile.**
Tibial mucro shorter, subangulate beneath near the tip; beak stronger, more coarsely sculptured.....60. **dolosum.**
9. Beak rather long and stout; species small, pubescent. 61. **carinirostrum.**
10. Middle and hind tibiæ mucronate (♂); plainly pubescent.
62. **peninsulare.**
Front and middle tibiæ mucronate (♂); scarcely pubescent.
63. **cribricolle.**
11. Middle and hind tibiæ mucronate (♂).
Elytral intervals strongly convex.....64. **porcatum.**
Elytral intervals flat or nearly so.
Anterior tarsi of ♂ not dilated.
Second joint of antennæ reaching the eye; beak more finely punctate.
Tibial mucro short; abdomen coarsely punctate: intervals narrower, less flat.....65. **centrale.**
Tibial mucro longer; abdomen less coarsely punctate; intervals flat.
66. **rostrum.**
Third joint of antennæ reaching the eye; beak longer, coarsely punctate.....67. **coloradense.**
Anterior tarsi of ♂ dilated.....68. **nigrum.**
All the tibiæ mucronate (♂), the anterior sometimes very minutely so.
Superior margin of antennal fovea scarcely at all angulate. (Pl. IV, fig. 22).
Striæ deeper; intervals more or less convex; tibial mucro stronger.
69. **cordatum.**
Striæ shallow: intervals flat.
Beak rather strongly attenuate, scarcely different in the sexes.
70. **oblitum.**
Beak scarcely, or at most feebly attenuate, longer in the ♀.
71. **furtivum.**
Superior margin of antennal fovea rather strongly angulate. (Pl. IV, fig. 21).
Mucro of middle and hind tibiæ irregular, or appendiculate beneath; beak less attenuate; size larger, more convex.....72. **commodum.**
Tibial mucro simple: beak more attenuate; size smaller, less convex.
73. **confertum.**

34. **A. opacicolle** Smith.—Black, very sparsely and finely pubescent. Beak (♂) not slender, shorter than the head and prothorax; sides parallel, dilated a little behind the middle, and feebly at the tip; surface dull, moderately punctate; tip polished, (♀) a little longer, less dilated. First joint of the antennæ shorter than the next two, third reaching the eye. Front more or less canaliculose; eyes moderate. Prothorax usually a very little wider than long; sides nearly parallel, slightly diverging posteriorly; apical constriction feeble; surface closely punctate, a sub-basal impressed line. Elytra about three-fourths longer than wide; humeri prominent; post-humeral sinuation feeble; sides slightly arcuate, width greatest just behind the middle; striæ deep; intervals narrow, not much wider than the striæ, nearly flat at their summits, more or less rugose or transversely wrinkled. Beneath strongly but not very closely punctate, the sides of the metasternum rather more closely punctured than the abdomen. Legs moderate; claws with a small acute tooth. Length 1.8–2 mm.; .07–.08 inch.

♂. Front and middle tibiæ feebly mucronate; metasternal spicules present.

♀. Tibiæ unarmed.

Hab.—Washington, Oregon, California.

A male and female from Placer County, California, have been selected as the types. In these there is not much sexual difference in the elytral tips. The tip of the right elytron is rounded slightly in both sexes, that of the left scarcely rounded. One female shows feeble metasternal spicules, others do not. With the types above mentioned I have associated several female examples in various collections, which differ more or less from the types and from each other, while they agree fairly well in general facies. If on the appearance of males the identity is proved, the following variations are to be noted:

The beak may be much longer than described; the tip polished to a variable extent. The prothorax may be obviously wider than long, with the sides divergent to the middle and parallel in basal half. The elytral intervals may be wider and convex. Notwithstanding these variations, with moderate care, there should be no difficulty in recognizing *opacicolle;* and if males be present, identification becomes perfectly simple. The presence of the metasternal spicules is worthy of especial note as being the only instance known to me outside of Section I. The affinity with the first section thus unmistakably established is furthered by the feebly-toothed claws as well as the general facies.

35. **A. coxale** n. sp.—Elongate, black, sometimes with a feeble, greenish bronze lustre, finely, sparsely pubescent. Beak (♂) as long as the head and prothorax, slender, rather feebly curved, slightly dilated, parallel, strigose and punctate in basal two-thirds, thence more sparsely punctate and shining; (♀) longer than the head and thorax, more slender, not at all dilated, slightly expanded

toward the tip, very finely sculptured and punctulate throughout. First joint of antennæ as long as the next two (♂), or three (♀). Front narrow, very little wider than the tip of the beak, subdepressed, canaliculate; a narrow line of whitish squamules along the inner margins of the eyes, which are not prominent. Prothorax about as long as wide, widest one-third from the base; sides arcuate behind the well-marked apical constriction, sinuate before the base; surface rather sparsely punctate, with an elongate basal fovea. Elytra not quite twice as long as wide, subparallel (♂), a little wider behind the middle (♀); humeri not prominent; intervals somewhat variable, usually less than twice as wide as the striæ, and feebly convex. Beneath sparsely or moderately punctate; the meso and metasternal side pieces conspicuously clothed with white squamiform pubescence. Legs slender; claws with a rather strong tooth. Length 1.9 2.1 mm.; .075-.085 inch.

♂. Sutural angles rounded; anterior coxæ bearing a conical tubercle at summit; middle and hind tibiæ with a very small mucro.

♀. Sutural angles obtuse; anterior coxæ scarcely modified; tibiæ unarmed.

Hab.—District of Columbia, North Carolina, Lower California, Arizona.

The last locality is represented by a male in the National Museum collection, which differs from eastern examples only in the beak being entirely polished beyond the insertion of the antennæ. It is very well preserved, and the pubescence is a little more evident than usual. The Lower California example is a female presenting no variation worthy of note.

The sides of the prothorax as well as the elytra are more parallel in the male. The peculiar sexual character is unique. A species of wide distribution, but as yet not common in collections.

36. **A. tenuirostrum** Smith.—Moderately elongate, black, sometimes with faint, cupro-æneous lustre; pubescence consisting of rather sparse squamiform hairs, which tend to become condensed on the third elytral interval. Beak as long as the head and prothorax, often considerably longer (♀), moderately or feebly arcuate, slender, scarcely dilated, parallel, polished except toward the base, sparsely punctulate. Antennæ rather short, first joint scarcely equal to the two following, second reaching the eye. Front with a few serially arranged punctures at the sides, middle scarcely sulcate; eyes feebly convex, not at all prominent. Prothorax as long or a little longer than wide; base but little wider than the apex, widest at or a little behind the middle; sides arcuate, except for the apical constriction; basal margin not expanded; surface densely, coarsely punctate, with an elongate, basal fovea. Elytra about one-half longer than wide; humeri moderate; sides feebly arcuate; striæ deep; intervals narrow, convex, shining. Beneath coarsely, deeply, rather closely punctate. Femora stout, first three tarsal joints subequal, fourth as long as the two preceding together. Claws acutely toothed. Length 1.8 2.4 mm.; .07-.095 inch. (Pl. IV, fig. 1).

♂. Sutural angles rounded; all the tibiæ with a nearly simple mucro, which projects almost at right angles to the tibia.

♀. Sutural angles not rounded, sometimes slightly produced; tibia unarmed.

Hab.—Kansas, Nebraska, Texas, Colorado, Montana (Fort Assiniboine).

A series collected by Mr. Schwarz in the latter locality shows a more transverse prothorax, with base and apex more unequal, shorter, more arcuate beak, wider less convex elytral intervals, and less shining surface. With these, however, occurred individuals agreeing with those from further south. The fully armed male tibiæ, combined with the peculiar tarsal structure and shining surface, are sufficient to identify this very distinct species.

37. **A. æneipenne** Smith.—Moderately elongate, black; prothorax opaque: elytra with purplish bronze lustre; tibiæ, base of femora and basal joints of antennæ rufous; pubescence fine and sparse. Beak scarcely differing in the sexes, moderately strong, as long as the head and prothorax, parallel, dilated about one-third from the base, tip slightly broader; surface finely strigose and punctate; tip polished. Antennæ rather short, first joint about equal to the second and third united, seventh and eighth transverse, second reaching the eye. Front strongly punctate, the punctures tending to coalesce longitudinally; eyes not large, moderately prominent. Prothorax a little wider than long; base not much wider than the apex, widest two-fifths from the base; sides arcuate; apical constriction feeble; basal margin not expanded, densely, strongly punctate; basal fovea small, punctiform. Elytra about two-thirds longer than wide, very slightly wider behind the middle; sides subparallel; humeri moderate; intervals wide, flat. Beneath densely, rather coarsely punctate; meso and metasternal side pieces clothed with white squamiform hair; legs moderate. Length 2.4 mm.: .095 inch.

♂. Sutural angles rounded: middle and hind tibiæ with small, non-dentellate mucro.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—District of Columbia.

Described from one male and four females; collections of Mr. Schwarz and Dr. Dietz. The single male shows a tubercle near the base of the first ventral, which is probably not accidental.

A fine species and evidently rare. It is easily distinguished by the characters in the table.

38. **A. impexum** n. sp.—Black, rather densely clothed with whitish squamiform hairs, which are easily removed. Beak slender, not strongly arcuate, cylindrical, as long as or a little longer than the head and prothorax, and rather feebly dilated (♂), decidedly longer, not dilated (♀), with fine sculpture at base, a furrow over the insertion of the antennæ, beyond which it is entirely polished with very few, fine punctures. Antennæ moderate, first joint equal to the next two, second slender, three-fourths as long as the first, and equal to the third and fourth together, third reaching the eye. Front punctate, the punctures tending to arrange themselves in longitudinal lines; eyes small, widely separated but not prominent. Prothorax as long as wide, widest near the middle; apical margin thickened; sides rounded to the base; surface densely, not very coarsely punc-

tate, with an impressed line, which does not reach beyond the middle. Elytra about one-half longer than wide, subparallel; humeri moderate; sides feebly arcuate, without post-humeral sinuation; striæ not deep; intervals about one-half wider than the striæ, flat or slightly convex, more or less finely wrinkled; punctuation beneath not dense; legs moderate, last tarsal joint extending beyond the lobes of the third for a distance much greater than their length; claws strongly toothed. Length 2 mm.; .08 inch.

♂. Sutural angles rounded; middle and hind tibiæ with rather long, slender, simple mucro.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—Lower California (San Julio).

About a dozen specimens seen, and presenting no variation worthy of note. This species bears a superficial resemblance to several others, but the long polished, apically subimpunctate beak with the characters given in the table will make it easily recognizable It is probably confined to the Peninsula.

39. **A. metallicum** Gerst.—Black, more or less æneous; vestiture hairy, rather plentiful. Beak rather slender, moderately curved, subequal to the head and prothorax (♂), or longer (♀), feebly dilated one-fourth from the base, cylindrical and polished beyond the dilatation; punctuation variable, but usually rather sparse; the superior margin of the antennal fossa strongly angulate. First joint of antennæ subequal to the two following, second reaching the eye. Front wide, punctate, sometimes with a median impressed line; eyes prominent. Prothorax about one-third wider than long; sides strongly arcuate behind the apical constriction; base not expanded; surface closely, deeply, but not very coarsely punctate; basal fovea well marked. Humeri moderate; sides of elytra subparallel, or feebly arcuate (♀); intervals wide, flat. Beneath coarsely but not closely punctate. Legs moderately stout. Length 1.5-2 mm.; .06-.08 inch. (Pl. IV, fig. 5).

♂. Middle and hind tibiæ with slender, simple mucro.

♀. Tibiæ unarmed.

Hab.—Texas, Louisiana, North Carolina, South Carolina, Florida.

There is very little sexual difference in the elytral tips, the angles being only slightly less well marked in the male. Very close to the following species, which see for a statement of differences.

40. **A. troglodytes** Mann.—So close to the preceding that a detailed description is not necessary. The prothorax is not or but little wider than long, with the sides less strongly arcuate. The elytra are generally more robust, with the sides less parallel. The beak is a little more slender and less elongate in the ♀; the tarsi not quite so stout. In *troglodytes* the third joint is often as wide as long, while in *metallicum* the third joint is always longer than wide. The claws are also a little more strongly toothed in *metallicum*. The form of the thorax is the most reliable character for separation, but the present species is held as distinct from an assemblage of small differences, rather than from the presence of any very strongly-marked characteristics. (Pl. IV, fig. 6).

An abundant species from Central to Southern California.

41. **A. propinquicorne** n. sp.--Black, rather plentifully clothed with white squamiform hairs. Beak slender, cylindrical, scarcely dilated, as long as the prothorax (♂), or equal to the head and prothorax (♀), finely, sparsely punctate, and entirely polished beyond the insertion of the antennæ. Antennæ inserted very near the base of the beak, first joint nearly or quite equal to the next two and reaching the eye. Front wide, not or scarcely sulcate; eyes prominent. Prothorax slightly wider than long; base about one-fifth wider than the apex, and very little or not at all wider than at the middle; apical constriction well marked; sides slightly sinuate posteriorly; surface rather sparsely not coarsely punctate. Body moderately robust; humeri moderate; sides of elytra subparallel (♂), or a little wider behind the middle (♀); intervals somewhat convex. Punctuation beneath moderately fine, not close. Length 1-5 mm.; .06 inch. (Pl. IV, figs. 7 and 7*a*).

♂. Sutural tips rounded; middle and hind tibiæ with simple mucro.

♀. Sutural tips not rounded; tibiæ unarmed.

Hab.—Texas.

Two males and three females from Southern Texas (San Diego). Collected by Mr. Schwarz and now in the collection of the U. S. Department of Agriculture. This species and the following are easily recognized by their size, vestiture and slender polished beak, with the antennæ inserted very near the base. For a statement of differences see remarks under *modestum*.

42. **A. modestum** Smith.—Very closely allied to the preceding, the description of which so nearly applies that a comparative statement only is necessary. The form is quite noticeably less convex; the thorax slightly smaller and more transverse, always as wide, and in some examples a little wider behind the middle than at the base. The elytra are more elongate, a little less parallel and less pubescent. The beak is stouter at the base and more coarsely punctate about the insertion of the antennæ in the ♂, and noticeably less arcuate in both sexes. The antennæ are a trifle less basal, the first joint scarcely reaching the eye, at least in the ♂. The elytral intervals are nearly flat above, but become more or less convex toward the sides. (Pl. IV, figs. 8 and 8*a*).

Hab.—Illinois, Nebraska, Colorado.

I have seen a specimen labeled Cal.; probably the result of carelessly writing Col.

43. **A. subtinctum** n. sp.--Black with reddish bronze lustre, which is especially well marked on the elytra; legs brownish. Beak (♂) not stout, as long as the head and prothorax, feebly dilated, somewhat attenuate, polished, with a few strong punctures about the insertion of the antennæ, otherwise sparsely, finely punctulate; (♀) a little longer, more slender, and still more finely, sparsely punctulate. Antennæ rather stout, inserted near the base, first joint equal to the two following and reaching the eye. Front sulcate, not much wider than the tip of the beak; eyes prominent. Prothorax a little wider than long; apical constriction moderate; subparallel in basal half, with slight ante-basal sinuation; surface sparsely, rather finely punctate, the punctures generally superficial, with their posterior margins more abrupt; basal fovea nearly obsolete.

Elytra about twice as wide as the prothorax, widest behind the middle; humeri moderate; intervals wide, smooth, flat or very feebly convex. Beneath sparsely, rather finely punctate; meso and metasternal side pieces clothed with white squamiform hairs. Legs slender, rufescent. Length 1.4–1.8 mm.; .06–.07 inch.

♂. Sutural angles rounded; middle and hind tibiæ with moderate simple mucro.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—Texas (Columbus and San Antonio), Lower California (La Chuparosa).

Bears quite a strong resemblance to *turbulentum*, but is readily separated by the more basal antennæ; smaller, more sparsely, less deeply punctate prothorax; wider elytral intervals and reddish surface lustre. The elytra are also more longitudinally convex, and more widened posteriorly. A single female from Lower California is before me, differing only from the Texan examples by its somewhat larger size and less evident reddish lustre of the elytra.

44. **A. pervicax** n. sp.—Black, with trace of æneous lustre; surface finely rugulose; pubescence fine, sparse. Beak (♂) barely as long as the head and prothorax, rather slender and noticeably attenuate; basal dilatation not strong; surface polished beyond the dilatation; punctuation fine and sparse; tip subimpunctate; (♀) a little longer and more slender, and polished only in apical third. Antennæ with basal joint nearly equal to the two following, and nearly or quite reaching the eye. Front punctate and sulcate, much wider than the tip of the beak; eyes moderately prominent. Prothorax wider than long, as wide at the middle as at the base; apical constriction and basal sinuation well marked; surface moderately, coarsely and closely punctate; a median impressed line extending from the basal fovea to the apex. Elytra subparallel in basal two-thirds; humeri moderate; intervals flat, less than twice as wide as the striæ. Beneath rather strongly but not very closely punctate. Length 1.4–1.6 mm.; .06 inch, more or less. (Pl. IV, figs. 2 and 14).

♂. Sutural angles rounded; middle and hind tibiæ with very small mucro.

♀. Sutural angles not rounded; tibiæ unarmed.

Described from two males (Tampa, Fla.), and one female (Hillsboro, Fla.), collected by Mr. Schwarz. The males are to be considered the types, as it is not absolutely certain that the female is properly associated with them. The prothorax is a little smaller, more narrowed behind, and lacks the complete impressed line. This last-named character is very exceptional in this section and its constancy not at all probable. The superficial resemblance of *pervicax* to *turbulentum* is so close as to make them almost indistinquishable. The more slender attenuate beak, more basal insertion of antennæ and feebly mucronate tibiæ will make it readily separable when males are at hand.

45. **A. gulare** n. sp.--Black, with reddish æneous lustre; legs rufescent. Vestiture consisting of rather sparse squamiform hairs. Beak as long as the head and prothorax (♂), noticeably longer and more slender (♀), rather feebly curved, cylindrical; basal dilatation moderate; tip slightly expanded; surface entirely shining, sparsely punctate. Basal joint of antennæ scarcely longer than the second, second as long as the next two, not reaching the eye. Front sulcate, with lateral confluent lines of punctures; eyes not large, moderately prominent; head beneath excavated and polished. Prothorax a little wider than long; base about one-fourth wider than the apex, width a little behind the middle subequal to the base; posterior sinuation slight; surface alutaceous, moderately punctate; basal fovea small, shallow. Elytra widest behind the middle; humeri not very prominent; striæ not deep; intervals wide, nearly flat; the hairs proceeding from the strial punctures more conspicuous than usual. Beneath sparsely, finely punctate. Length 1.6-1.9 mm.; .065-.075 inch.

♂. Sutural angles rounded; middle and hind tibiæ minutely mucronate.

♀. Sutural angles not rounded; tibiæ unarmed.

Taken in some numbers by Mr. Schwarz or Mr. Hubbard, at Key West, Florida, also at Biscayne. Resembles *subtinctum* somewhat, but very distinct by the characters given.

46. **A. proclive** Lec.--Form variable, usually moderately robust, black, with or without æneous lustre, pubescent. Beak (♂) moderate, feebly arcuate, punctate and pubescent in basal two-thirds; tip glabrous, shining; (♀) nearly twice as long as in the male, more slender, finely sculptured and punctulate throughout. In both sexes there is a feeble basal dilatation, and the usual furrow over the insertion of the antennæ; basal joint of antennæ as long as the two or three following, being longer in the ♀; eyes not prominent; front sulcate. Prothorax variable; in the majority of specimens a little wider than long, more or less constricted at the apex; base subequal to or a little wider than the middle, sometimes with a slight posterior sinuation; surface closely, rather coarsely punctate, with a small basal fovea. Elytra variable; sides subparallel or broadly arcuate, this difference being mainly sexual; surface somewhat shining; intervals wide, flat or slightly convex. Beneath strongly, rather closely punctate; claws strongly toothed. Length 2.-2.6 mm.; .08-.0104 inch. (Pl. IV, figs. 9, 9*a*, 9*b* and 15).

♂. Sutural angles rounded; middle and hind tibiæ with a long mucro, which is dentellate beneath near the tip.

♀. Sutural angles not or scarcely rounded; tibiæ unarmed.

Hab.—California, Oregon, Utah, Colorado, Wyoming.

The large number of specimens before me exhibit considerable variation in the proportion of parts. Specimens in the National Museum from Death Valley, California, are smaller and more slender than usual; others taken by Mr. Wickham at Tehachapi, California, have the thorax unusually narrow. Specimens from the region about San Francisco are quite strongly æneous. The sexual characters are, however, practically identical throughout, and are the ones upon which reliance must be placed.

I have little doubt that this species extends much farther north along the Pacific Coast than the above localities indicate, and am confident that *cuprescens* Mann., described from Alaska, is founded on examples similar to the San Francisco specimens above mentioned. An examination of the LeConte types of *proclive* and *crassinasum* shows that they are respectively female and male of the same species. I have chosen to suppress the latter name as being the less characteristic of the two.

47. **A. chuparosæ** n. sp.—Robust, black, pubescent. Beak (♂) stout, shorter than the head and prothorax, feebly dilated one-third from the base, thence very slightly narrowing to the tip, finely sculptured almost throughout, moderately punctate and pubescent, with a supra antennal groove, which extends from the base to beyond the middle; (♀) a little longer than the head and prothorax, more slender and less pubescent. Front trisulcate; eyes large, moderately prominent. Prothorax a little wider than long; base nearly one-half wider than the apex; sides rounded behind the apical constriction, subparallel in basal third; basal margin rather strongly expanded; surface moderately, strongly, closely punctate, with an elongate basal fovea. Elytra subparallel in basal three-fifths, about one-third longer than wide; humeri prominent; intervals wide, slightly convex; pubescence condensed at the bases of the third intervals. Beneath rather densely clothed with elongate scales; punctuation strong, rather close. Length 2.-2.4 mm.; .08–.10 inch. (Pl. IV, fig. 16).

♂. Sutural angles narrowly rounded; middle and hind tibiæ with rather short, strongly, dentellate mucro.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—Lower California (La Chuparosa).

48. **A. grossulum** n. sp.—Very robust, black, slightly æneous; vestiture consisting of rather sparse, subsquamiform hairs. Beak (♂) as long as the head and prothorax, not slender, moderately curved and dilated, coarsely, closely punctate throughout; supra antennal groove short but deep, first antennal joint scarcely as long as the next two, outer joints becoming transverse, first nearly reaching the eye. Front rather deeply trisulcate; eyes large, prominent. Prothorax a little wider than long; basal margin expanded and nearly one-half wider than the apex; sides arcuate; apical constriction well marked, the apical margin thickened; surface rather coarsely, closely punctate; basal fovea punctiform. Elytra ventricose, not more than one-third longer than wide, widest a little behind the middle; humeri moderate; striæ well impressed; intervals nearly twice as wide as the striæ, moderately convex. Beneath densely, strongly punctate; legs not stout. Length about 2.3 mm.; .09 inch.

♂. Middle and hind tibiæ with moderately long mucro, which bears an acute denticle beneath.

Hab.—Arizona (?)

Described from a unique male in the LeConte collection, where it was confused with *abdominale*. The specimen bears no locality label, but the style of mounting and its associations make it practically certain that the locality named is correct.

49. **A. patruele** Smith.--Robust, ventricose, black, sparsely, finely pubescent. Beak strong, subparallel, dull, finely punctate above, more coarsely at the sides, about as long as the head and prothorax (♂), noticeably longer and very finely punctulate (♀). Antennæ inserted rather near the base, first joint barely as long as the next two, second reaching the eye. Front sulcate; eyes moderately prominent. Prothorax broader than long; apical constriction well marked; subparallel in basal half; basal margin slightly expanded; punctuation moderately coarse, not dense; basal fovea well marked. Elytra less than one-half longer than wide; humeri prominent; sides straight or feebly arcuate and slightly divergent to just beyond the middle, thence more strongly rounded to apex. Striæ deep, intervals twice as wide as the striæ, more or less convex. Punctuation beneath somewhat variable, usually rather fine and sparse for this section. The punctures are most closely placed at the sides of the metasternum and on the last ventral, the short ventrals are entirely impunctate, or with at most one or two feeble punctures at the sides. Legs rather slender; claws with a moderately large tooth. Length 1.6-2.3 mm.; .065-.09 inch. (Pl. IV, figs. 11, 11*a* and 17).

♂. Sutural angles rounded; middle and hind tibiæ with a short, subapically, dentate mucro.

♀. Sutural angles not rounded; tibiæ unarmed.

Occurs from the New England States to Florida, and westward to Michigan, Illinois and Texas.

This species is a common one in the Atlantic Coast region, and shows very little variation, except in size and convexity of elytral intervals. One example from Florida has the legs and antennæ rufescent. The only species occurring in the same region with which this is at all likely to be confused is *turbulentum*, which differs in rostral characters, flatter, narrower intervals and æneous lustre.

50. **A. walshii** Smith.--Elongate, black, pubescence fine but conspicuous. Beak feebly curved, parallel, tip slightly widened, scarcely longer than the prothorax (♂), as long as the head and prothorax, or at times much longer (♀); dilatation weak, two-fifths from the base (♂), about one-third or one-fourth from the base (♀), finely sculptured and moderately punctate throughout; the tip a little more shining. Front not sulcate and without conspicuous punctuation; eyes moderately prominent. Antennæ somewhat variable, first joint equal to the two or three following, second nearly (♂), or third (♀) reaching the eye. Prothorax wider than long, though sometimes very slightly so; apex not very much narrower than the base; sides rounded behind the apical constriction, as wide at or a little behind the middle as at base; posterior sinuation usually well marked; punctuation moderate; basal fovea not conspicuous. Elytra about three-fourths longer than wide, wider behind the middle, sometimes subparallel in the male; humeri not large; intervals nearly twice as wide as the striæ, more or less convex. Beneath rather densely pubescent; sparsely, finely punctate. Length 1.8-2.2 mm.; .07-.09 inch. (Pl. IV, figs. 12, 12*a* and 18).

♂. Sutural angles rounded; middle and hind tibiæ with a rather long simple mucro.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—New Hampshire (Mts. Washington and Monadnock, Blanchard), Massachusetts, District of Columbia, Maryland, Michigan (Marquette), Colorado, Montana, California (Siskiyon Co.).

A common and unusually widely distributed species, though apparently confined to the more northern regions. As might be expected there is a considerable degree of variation noticeable. The beak in the female varies much in length; the first antennal joint, while relatively longer in the female, varies somewhat in both sexes. In the examples from District of Columbia and Maryland the prothorax is more transverse and the punctuation closer, both above and below. The pubescence in these latter examples is sometimes more yellowish.

The specimens taken by Mr. Blanchard on Mt. Washington and Mt. Monadnock are decidedly larger than those seen from elsewhere, but there are no other apparent differences. I have followed Smith in his interpretation of Walsh's *lanuginosum* (which name was preoccupied), but the identification seems to me by no means certain. Walsh described his species as taken from galls made by a *Cecidomya* on *Salix strobiloides*. In New England both Mr. Blanchard and myself have taken it abundantly from April to August on white birch (*Betula alba*).

Abraded males from Colorado served as types for *vicinum* Smith.

51. **A. abdominale** Smith.—Robust, black; pubescence fine, not very conspicuous. Beak (♂) strong, subequal to the head and prothorax, moderately dilated, scarcely attenuate toward the tip, somewhat shining, fine sculpture extending nearly to the apex, moderately strongly punctate at the sides, more finely above, a conspicuous puncture at the point of dilatation, and a short supra-antennal groove. Antennæ strong, first joint scarcely as long as the next two, second reaching the eye. Front wide, with a shallow median sulcus, on either side of which is a line of confluent punctures; eyes not very prominent. Prothorax a little wider than long; base not very much wider than the apex; sides diverging from the apical constriction to the middle, thence subparallel to the base; posterior sinuation scarcely evident; surface moderately, closely, strongly punctate; basal fovea extending in front of the middle. Elytra ventricose, more than twice as wide as the prothorax, ovate; humeri small; sides arcuate, widest behind the middle; intervals not much wider than the striæ, flat or nearly so. Metasternum very little longer than the first ventral; punctuation rather coarse but not dense. Length 2.4 mm.; .095 inch. (Pl. IV, fig. 13).

♂. Sutural angles rounded; middle and hind tibiæ armed with a rather short mucro which is inferiorly subangulate.

♀. Not seen.*

*Since writing the above I have seen a ♀ in the LeConte collection. It differs from the ♂ in the smoother, slightly longer beak, which is noticeably dilated at the insertion of the antennæ.

Hab.—Arizona, California (probably from the southeastern part of the State).

Four males, collections of Dr. Horn, National Museum and myself.

52. **A. perforicolle** n. sp.—Black; pubescence sparse but rather coarse. Beak (♂) barely as long as the head and prothorax, with numerous, rather coarse punctures about the insertion of the antennæ, more finely punctate above; apical third more shining, subimpunctate; (♀) noticeably longer than the head and prothorax, very finely, sparsely punctulate. The dilatation is distinct and rather abrupt in both sexes; the superior margin of antennal fovea angulatè; the form feebly, but noticeably attenuate beyond the dilatation. First antennal joint as long as the two following; (♀) or scarcely so (♂), second joint reaching the eye. Front feebly sulcate and with the usual lateral lines of punctures; eyes moderate. Prothorax rather large, a little wider than long; subparallel in basal two-fifths, thence arcuately narrowed to the apex, which is not constricted. There is a very feeble sinuation just before the basal margin, which is not expanded; surface very coarsely, deeply, somewhat irregularly punctate; the basal fovea elongate and profound. Elytra scarcely one-half longer than wide; sides subparallel to behind the middle; humeri moderate; intervals rather less than twice as wide as the striæ, flat or very slightly convex. Beneath coarsely punctate. Length 1.8-2.4 mm.; .07-.095 inch. (Pl. V, fig. 1).

♂. Sutural angles rounded; middle and hind tibiæ with a short mucro, which is more or less subangulate beneath.

♀. Sutural angles not rounded; tibiæ unarmed.

This species has thus far occurred only along the Atlantic Coast — from Southern New Jersey to Georgia. Some examples are very faintly æneous. The rather large thorax, which is very coarsely punctate and scarcely at all constricted apically, coarsely punctate abdomen and short tibial mucro, are sufficient to characterize this very distinct species.

53. **A. novellum** n. sp.—Moderately robust, black, pubescent. Beak (♂) barely as long as the head and prothorax, scarcely dilated, feebly narrowed toward the tip, not strongly or closely punctate; apical third polished; (♀) a little longer, more slender, finely sculptured throughout, very finely, sparsely punctate. Antennæ inserted near the base, first joint scarcely as long as the two following, third as long as the second but much more slender. Front punctate, with a short, fine impressed line between the eyes; eyes moderate. Prothorax plainly wider than long, width a little behind the middle subequal to the base; sides slightly sinuate before the base, which is somewhat expanded; surface moderately punctate. Elytra about one-third longer than wide; humeri strong; sides nearly parallel to behind the middle (♂), wider behind and more longitudinally convex (♀); intervals convex, about twice as wide as the striæ. Beneath moderately punctate. Length 1.5 mm.; .06 inch. (Pl. IV, fig. 19).

♂. Sutural angles rounded; middle and hind tibiæ with very long slender mucro.

♀. Sutural angles not in the least rounded; tibiæ unarmed.

Hab.—District of Columbia, Maryland.

Described from two males and two females, collected by Mr. Schwarz. A very distinct little species.

54. **A. nebraskense** n. sp.—Moderately elongate, not very convex, wider behind, moderately pubescent. Beak (♂) not quite as long as the head and prothorax, distinctly narrowed toward to the tip: basal dilatation moderate; surface rugose, very sparsely, obsoletely punctate in basal three-fourths; apical fourth polished, impunctate. Antennæ, front, eyes and prothorax as in the preceding species. Elytra about one-half longer than wide; humeri moderate; sides diverging to behind the middle; intervals wide, flat; striæ not very strongly impressed, especially toward the suture. Beneath rather strongly and coarsely but not closely punctate. Length 1.8 mm.; .07 inch.

♂. Sutural angles rounded; middle and hind tibiæ with a rather long slender mucro projecting almost in a line with the length of the tibia.

♀. Not seen.

Described from a single male taken at Superior, Nebraska, and kindly given me by Mr. Knaus. This species resembles both *novellum* and *minor* rather closely. From the former it differs most noticeably by its more elongate form, more attenuate beak and flat intervals, and from the latter by the slightly shorter first antennal joint and much less coarsely punctured ventral surface. From both it may be distinguished by the tibial mucro projecting in the line of the tibia rather than at a considerable angle as is usual. (Pl. IV, fig. 20.)

55. **A. minor** Smith.—Not very robust, black, moderately pubescent. Beak (♂) rather slender, scarcely as long as the head and prothorax, dilated at one-third from the base, attenuate, finely sculptured, except apical third which is polished, a few vague irregular punctures at the sides, (♀) a little longer than the head and thorax, very slender, less dilated and only slightly attenuate, finely sculptured throughout; tip a little more shining; punctuation fine and sparse. First antennal joint equal to the next two, second nearly reaching the eye. Front punctate, not sulcate; eyes moderately prominent. Prothorax nearly as long as wide, width a little behind the middle equal to the base: sides sinuate posteriorly; surface closely, coarsely, perforately punctate; basal fovea not conspicuous. Elytra fully three-fourths longer than wide, sides parallel (♂); a little less elongate, sides feebly divergent posteriorly (♀); intervals moderately wide and convex. Beneath very coarsely, deeply punctate. Length 1.5 mm.; .06 inch. (Pl. IV, fig. 10 and 10*a*).

♂. Middle and hind tibiæ with long simple mucro.

♀. Tibiæ unarmed.

The sutural angles in the male are only slightly rounded and not very different from the female. The small size and very coarse, deep punctuation of the prothorax and inferior surface, with the long tibial mucro (♂), readily separate this species from any other known to me.

56. **A. turbulentum** Smith.—Rather robust, black, with more or less æneous lustre: antennæ usually more or less brownish; pubescence sparse or moderate. Beak (♂) as long as the head and prothorax, not stout, moderately arcuate, slightly dilated, minutely longitudinally strigose nearly to the tip, finely punctured above, more coarsely serially at the sides, a confluent line of punctures over the insertion of the antennæ; (♀) not or very little longer than in the ♂, more slender and shining, not dilated, very sparsely, minutely punctulate throughout. First joint of the antennæ subequal to the next two, not reaching the eye; eyes moderately prominent; front with a median sulcus, on either side of which is a confluent line of punctures. Prothorax wider than long; apical constriction moderate; middle nearly or quite as wide as the base, before which there is usually a slight sinuation; surface rather closely punctate; basal fovea small, elongate. Elytra about one-half longer than wide; humeri prominent; sides parallel or feebly diverging to the middle; intervals nearly flat, scarcely twice as wide as the striæ. Beneath sparsely punctate, more closely at the sides of the metasternum and abdominal segments. Length 1.7–2 mm.; .07–.08 inch.

♂. Sutural angles rounded; middle and hind tibiæ with a moderately long, nearly simple mucro.

♀. Sutural angles scarcely rounded; tibiæ unarmed.

Hab.—New York, Pennsylvania, New Jersey, District of Columbia, Michigan, Illinois, Arkansas, Texas.

A female example in Dr. Dietz's collection, labelled Yuma, Cal., does not differ from eastern specimens, except in having the first antennal joint more elongate. An abundant species in the middle Atlantic region, and is said by Dr. Hamilton to occur on *Vaccinium stramineum*.

57. **A. importunum** n. sp.—Form moderate, black, vestiture rather sparse, not fine. Beak (♂) a little shorter than the head and prothorax, cylindrical, feebly dilated, sparsely punctulate, except about the insertion of the antennæ; supra-antennal groove moderately long; tip a little more shining; (♀) more slender, a little longer than the head and prothorax, scarcely dilated; supra-antennal groove not well defined; punctuation fine, sparse; surface more or less shining beyond the insertion of the antennæ, according to the distinctness of the finer sculpture; superior margin of antennal fovea distinctly angulate. Front punctate, more or less plainly sulcate; eyes moderate. Prothorax wider than long, widest at the base; apical constriction about as usual; basal sinuation feeble; punctuation moderate; basal fovea small. Elytra widening posteriorly; humeri not prominent; intervals wide, more or less convex; striæ generally, not deeply impressed; strial punctures strong. Beneath moderately punctate; metasternum rather conspicuously clothed with scales in well-preserved examples. Length 1.6 mm.; .065 inch.

♂. Middle and hind tibiæ with long simple mucro.

♀. Tibiæ unarmed.

Hab.—Georgia, Florida.

Two males and six females from various localities.

The sutural angle is only slightly rounded in the male, and not at

all in the female. *Importunum*, *turbulentum* and *pervicax* resemble one another so closely as to require considerable care in their separation. The very feebly mucronate male tibiæ easily separates *pervicax* when that sex is at hand, and it is believed that the tabular differences, supplemented by a careful reading of the descriptions, will enable the student to distinguish the two first named species with reasonable certainty. It is probable that *importunum* and *pervicax* are confined to the extreme southeast Florida and adjacent region, and the fact that in the large material examined no specimen of *turbulentum* appears from south of the Potomac in the Atlantic Coast region, is prima facie evidence that the latter species may, with confidence, be separated simply by its locality label.

58. **A. griseum** Smith.--Form moderate, black, often more or less æneous; pubescence conspicuous. Beak (♂) as long or a little longer than the head and prothorax, noticeably attenuate; apex slightly broader; basal dilatation feeble, punctate and with rather coarse, more or less bristling pubescence in basal two-thirds; tip glabrous, shining; (♀) very little longer than in the male, a little more slender, dull, glabrous and more finely punctate. First antennal joint as long as the two or three following, and nearly or quite reaching the eye, second and third subequal, the latter usually as long as the fourth and fifth together; eyes prominent; front sulcate or not. Prothorax wider than long; sides divergent to the base; apical constriction strong or moderate; basal margin expanded; surface uniformly, closely, not coarsely punctate; basal fovea present. Elytra about one-third longer than wide; humeri moderate; sides subparallel in basal three-fifths; intervals wide, flat or slightly convex. Punctuation beneath moderately strong and close but not dense. Length 1.7-2.1 mm.; .07-.085 inch.

♂. Sutural angles rounded; middle and hind tibiæ armed with a moderately long simple mucro.

♀. Sutural angles not rounded; tibiæ unarmed.

Occurs from New York to Florida, and westward to Colorado and Arizona.

A common and wide-spread species, exhibiting, as might be expected, considerable variation. The basal antennal joints are especially inconstant in their relative lengths. The pubescence varies in color from grayish to yellowish cinereous, and becomes coarser in the Arizona examples. As a rule, the eastern specimens are more noticeably æneous. *Fraternum* Smith was founded on such specimens, in which naturally, or from abrasion, the pubescence was less conspicuous. From *æquabile*, which it most closely resembles, *griseum* is distinguished by the antennæ being inserted nearer the base, the relatively longer first and third joints, and by the larger prothorax, with the sides posteriorly more divergent, as well as by the characters given in the table. This species is said by

Riley to occur in *Phaseolus pauciflora*. Mr. F. H. Chittenden records observing *fraternum* in great numbers on the leaves of two species or varieties of *Lespedeza* in July and August.

59. **A. sequabile** n. sp.—Moderately robust, black, pubescent. Beak about as in *griseum*, but a little more shining in the female. First antennal joint subequal to the next two, third a little longer than the fourth, much shorter than the two following united. Front not sulcate. Prothorax constricted before the base, which is not wider than the middle. Elytra a little wider just behind the middle; intervals moderately convex. Length 1.6–1.9 mm.; .065–.08 inch.

Hab.—Arizona, Lower California (La Chuparosa).

This species so nearly resembles the preceding that a more detailed description is not deemed necessary. It is a little smaller, and is probably never in the least æneous. I have selected as the types a series (♂ ♀) in the collection of the California Academy of Sciences from Lower California, and with them have placed a female from Arizona, in Dr. Horn's collection, which agrees in all essentials.

60. **A. dolosum** n. sp.—Moderately elongate but not slender, black, pubescent. Beak (♂) moderately stout, a little shorter than the head and thorax, dilated a little behind the middle; finely sculptured in basal three-fourths; sides rather coarsely and irregularly punctate and pubescent; tip shining; (♀) longer than the head and thorax, more slender, slightly dilated about one-third from the base; surface dull throughout; punctuation finer but strong, uniform and moderately close. First joint of antennæ as long as the three following in the ♀, a little shorter in the ♂, second joint reaching the eye. Front flat or vaguely sulcate; eyes moderately prominent. Prothorax as long as wide, widest behind the middle, sinuate before the base; surface closely, moderately, coarsely punctate, with an elongate basal fovea. Elytra a little more than one-half longer than wide; humeri not very prominent; sides nearly straight and diverging to behind the middle, thence rounding to tip; intervals about twice as wide as the striæ and nearly flat. Punctuation beneath close, not very coarse; legs rather stout; claws with a strong acute tooth. Length 2.5 mm.; .10 inch.

♂. Sutural tips narrowly rounded; middle and hind tibiæ with a rather short mucro which is subangulate below.

♀. Sutural tips not rounded; tibiæ unarmed.

Hab.—Arizona.

Taken by Mr. Wickham at Williams, and distributed in various collections. A specimen in Mr. Wickham's collection is labelled as being found on "Locust." The species is evidently related, but not especially closely, to the eastern *nigrum*, which has similar habits. Some variation in the length and basal sinuation of the thorax and in the width of the elytral intervals has been noticed.

61. **A. carinirostrum** n. sp.—Black, pubescence well marked. Beak (♂) a little shorter than the head and prothorax, rather stout, feebly curved, scarcely dilated, somewhat shining and pubescent nearly to the tip; (♀) longer than the

head and prothorax, nearly glabrous; sides parallel; surface less shining. In both sexes the punctures are rather large and confluent in longitudinal lines; the intervals more or less carinate. First antennal joint reaching the eye, as long as the three following (♀), a little shorter (♂). Front flat, narrower than the tip of the beak; eyes feebly convex, not at all prominent. Prothorax nearly as long as wide; base about one-fourth wider than the apex; apical constriction feeble; sides subparallel in basal half, with a slight posterior sinuation; surface moderately, strongly and closely punctate; an impressed line at the base. Elytra a little wider at the middle; humeri moderate; sides feebly arcuate in basal half, more strongly posteriorly; intervals rather wide, convex. Punctuation beneath moderate. Length 1.5-1.7 mm.; .06-.07 inch.

♂. Sutural tips rounded; middle and hind tibiæ mucronate.

♀. Sutural tips not rounded; tibiæ unarmed.

Hab.—Arizona (Santa Rita Mountains, Wickham).

A very distinct species and easily recognized by the canaliculate and carinate beak, the narrow front and feebly convex eyes.

62. **A. peninsulare** n. sp.—Black, sparsely pubescent. Beak (♂) not as long as the head and prothorax, stout, strongly dilated a little behind the middle, moderately shining, rugosely punctate at the sides, more finely and sparsely above. Antennæ rather short, first joint scarcely as long as the two following, second subglobose, barely reaching the eye. Front feebly sulcate; eyes not prominent. Prothorax about as long as wide; base one-fourth wider than the apex; sides divergent to the middle, thence subparallel. Elytra one-third longer than wide; humeri moderately prominent; sides subparallel, very feebly arcuate; intervals wide, moderately convex, rather strongly uniformly punctate beneath. Legs not stout; claws strongly toothed. Length 2 mm.; .08 inch. (Pl. V, figs. 2 and 2*a*).

♂. Sutural tips narrowly rounded; middle and hind tibiæ with a short mucro.

♀. Not seen.

Hab.—Lower California (La Chuparosa).

A single male from the above locality. The sexual characters and stout, strongly dilated beak at once separate this species from any known to me. It resembles somewhat *reclusum*, which, however, by its simple claws belongs to an entirely different section of the genus.

63. **A. cribricolle** Lec.—Robust, black, more or less æneous; pubescence almost entirely wanting. Beak very short, stout, tapering from eyes to tip, and punctate throughout in both sexes. Front striate; eyes small, not prominent. Antennæ with the first joint very little longer than the second, third reaching the eye. Prothorax small, a little wider than long; sides divergent to nearly the middle; parallel in basal half or three-fifths; surface rather finely, densely punctate; an impressed line near the base. Elytra ventricose; humeri prominent; sides feebly divergent or subparallel to behind the middle; intervals usually not much wider than the striæ, flat or feebly convex, usually shining, but sometimes finely rugulose or transversely wrinkled and opaque. Beneath strongly, moderately, closely, but not coarsely punctate; legs rather slender;

claws with a moderate tooth. Length 2-2.5 mm.; .08-.10 inch. (Pl. V, figs. 3 and 3*a*).

♂. Sutural tips only slightly more rounded than in the ♀; front and middle tibiæ with a very short mucro.

♀. Beak slightly longer; sutural tips scarcely rounded; tibiæ unarmed.

Hab.—Pacific Coast, from Oregon to San Diego; also found in Utah (Knaus).

A not uncommon species throughout the region indicated, and one which there is no possibility of confusing with any other. Only one other species—*opacicolle*—is known with similar tibial armature, and this is readily distinguished by the dull black surface, more elongate form and slender beak.

Cribricolle was described from a single specimen taken at San Francisco and was in common with many other species, including several species of *Apion*, recorded under a given number in one of Dr. LeConte's note books. Through some mischance or other there is now no specimen in the LeConte cabinet bearing either this number or name in Dr. LeConte's handwriting, and we are therefore forced to depend upon the description for an identification of the species. In his synopsis of the genus Prof. Smith uses this name for sundry examples of Section I, the majority of which are the species here regarded as *melanarium*, and none of which are from California. Moreover, as Prof. Smith had the LeConte material, and in his description of *cribricolle* does not give California in the list of localities, it seems certain that he too did not see the original type. After a careful study of the original description I am forced to conclude that LeConte really had in hand an example of the species afterwards described by Smith as *brevicolle*, a species which is not rare about San Francisco, and which corresponds very well with LeConte's description.

64. **A. porcatum** Boh.—Very robust, black; pubescence very sparse, fine and inconspicuous. Beak moderately stout, minutely reticulate and punctate throughout, a confluent line of punctures over the insertion of the antennæ. First joint of antennæ as long or a little longer than the next two, second reaching the eye. Front not or very feebly sulcate, with two lines of punctures which tend to coalesce; eyes moderately prominent. Prothorax wider than long, widening to the middle, thence subparallel to the base, before which there is a slight sinuation; punctuation coarse, moderately dense, a foveate line at base. Elytra one-fourth longer than wide; humeri strong; sides slightly diverging to beyond the middle; intervals strongly convex, but little wider than the striæ; legs moderate; claws armed with a strong tooth. Length 2.2-2.6 mm.; .09 .10 inch nearly.

♂. Beak as long or a little longer than the prothorax, moderately dilated; sutural tips of elytra rounded; middle and hind tibiæ armed with a mucro which bears a minute denticle beneath near the tip.

♀. Beak longer, more finely punctured, feebly dilated; sutural tips of elytra not rounded; tibiæ unarmed.

Hab.—Pennsylvania, District of Columbia, Massachusetts, Ohio, Virginia, Kentucky, Texas.

Easily known by the large size, robust form, sparse pubescence and strongly convex intervals. It seems rather rare in New England, but is more common from District of Columbia westward to Kentucky.

65. **A. centrale** n. sp.—Very robust, black, sparsely pubescent. Beak (♂) stout, about as long as the head and prothorax, strongly dilated, somewhat attenuate, finely sculptured throughout, feebly shining, roughly punctate about the insertion of the antennæ, more finely above and apically; (♀) a little longer, very finely, sparsely punctulate beyond the insertion of the antennæ. Antennæ rather stout, first joint subequal to the two following, second reaching the eye; eyes prominent. Prothorax wider than long, widest at or a little behind the middle; apex constricted, narrowed more or less plainly before the base; punctuation coarse and close but not crowded; basal fovea strong. Elytra obese, scarcely one-half longer than wide; humeri prominent; sides feebly arcuate in basal half, widest a little behind the middle; intervals twice as wide as the striæ, nearly flat or moderately convex. Beneath very coarsely punctured; legs strong, claws with a moderate tooth. Length 2.1-2.4 mm.; .08-.095 inch.

♂. Sutural angles broadly rounded; middle and hind tibiæ with a very short mucro which is subangulate beneath.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—Colorado, Montana, Hudson Bay Territory, British Columbia,

This species has been heretofore confounded with *rostrum*, to which it is closely related, but sufficiently distinct by its smaller size, stouter body, heavier beak, more coarsely punctate abdomen, more convex intervals and short tibial mucro.

66. **A. rostrum** Say.—Robust, not very convex, black, sparsely pubescent. Beak moderately stout, feebly tapering, finely sculptured throughout, dilated, with a conspicuous puncture over the insertion of the antennæ. First joint of antennæ not reaching the eye, as long as the next two. Front sulcate; eyes prominent. Prothorax wider than long; sides strongly rounded, narrowed before the base, coarsely, closely punctate, foveate at base. Elytra about one-half longer than wide; humeri strong; sides nearly parallel; intervals wide, flat, each with a single, more or less regular row of shallow punctures. Beneath closely, strongly punctured; legs moderate; tarsi stout, the second joint as wide as long, and not longer than the lobes of the third joint; claws strongly toothed. Length 2.5-3 mm.; .10-.12 inch.

♂. Beak as long as the prothorax; tips of elytra separately rounded; middle and hind tibiæ with dentellate mucro.

♀. Beak one-fourth longer, more finely, sparsely punctulate; tips of elytra conjointly rounded; tibiæ unarmed.

Hab.—New Hampshire to Florida and westward to Wisconsin and Texas.

A common species throughout the eastern United States. It occurs abundantly in New England on the wild indigo, *Baptisia tinctoria*, in the seeds of which it breeds. Our largest species with the exception of *umboniferum*.

67. **A. coloradense** n. sp.—Moderately elongate, wider behind, not very convex, black, rather sparsely pubescent. Beak (♂) a little longer than the head and prothorax, tolerably strong, arcuate, nearly parallel, moderately dilated at about one-third from the base, coarsely punctate except at the tip, which is more shining; (♀) decidedly longer, often exceeding half the length of the body. First joint of the antennæ barely as long as the next two, third reaching the eye. Front with rows of punctures and a not very distinct median sulcus: eyes not very prominent. Prothorax wider than long, widest a little before the base; sides arcuate, rather feebly constricted in front, coarsely, densely punctate; basal fovea distinct. Elytra fully one-half longer than wide, widest behind the middle; humeri moderate; intervals flat, less than twice as wide as the striæ. Beneath coarsely, evenly, but not densely punctate; the third and fourth segments punctate, at least at the sides; legs moderate. Length 2–2.6 mm.; .08–.10 inch.

♂. Sutural angles rounded; middle and hind tibiæ with a rather short mucro which is subangulate beneath.

♀. Sutural angles scarcely rounded; tibiæ unarmed.

Hab.—Colorado (Colorado Springs 6000–7000 feet—Wickham).

In some examples the thorax is so feebly narrowed before the base as to make its reference to the present group doubtful. It will then be traced to "6" in the table, under which are found *proclive*, *chuparosæ*, *grossulum* and *patruele* It is much less robust than either of the last three named, and from *proclive* may be separated by the longer, more arcuate beak in the male, and the shorter, less strongly angulate tibial mucro.

68. **A. nigrum** Hbst. Moderately robust, not very convex, black, moderately or sparsely pubescent. Beak (♂) as long or a little longer that the thorax, dilated, punctate, pubescent, slightly narrowed toward the tip; (♀) longer, glabrous, punctate, scarcely dilated, or narrowed toward the tip. First antennal joint subequal to the three following, second reaching the eye. Front not sulcate: eyes prominent, Prothorax wider than long: sides rounded; basal and apical constrictions well marked; punctuation coarse, but rather superficial, and with a tendency toward irregularity: base with an elongate fovea. Elytra one-half longer than wide, widest slightly behind the middle; humeri less prominent than in *rostrum*; striæ deep; intervals usually feebly convex with fine punctures subserially placed. Beneath strongly, moderately, closely punctured. Length 2–2.4 mm.; .08–.095 inch.

♂. Anterior tarsi rather strongly dilated; middle and hind tibiæ with a moderately long mucro which is subangulate beneath.

♀. Front tarsi not dilated; tibiæ unarmed.

Hab.—New Hampshire, Massachusetts, New York, Pennsylvania, New Jersey, District of Columbia, Indiana, Iowa, Illinois, Kansas.

The dilated male tarsi is a character noticed in no other species in our fauna. There is very little difference in the form of the elytral tips in the two sexes. Common on locust, *Robinia pseudacacia*.

69. **A. cordatum** Smith.—Black, plainly pubescent. Beak (♂) moderate, slightly dilated with numerous punctures in basal half, especially towards the sides; apical half polished with a few fine punctures; (♀) longer, scarcely dilated, less polished, apically and more finely punctate. First joint of antennæ as long as the two or three following, second joint reaching the eye. Front scarcely wider than the tip of the beak, feebly or not sulcate; eyes moderately prominent. Prothorax as long as broad; sides arcuate, widest at the middle; slightly sinuate before the base, moderately, densely, coarsely punctate with an elongate basal fovea. Elytra one-half longer than wide, parallel or slightly wider posteriorly; humeri moderate; intervals more or less convex. Beneath rather closely, not very coarsely punctate; legs moderate; claws strongly toothed. Length 2-2.5 mm.; .08-.10 inch. (Pl. IV, fig. 3).

♂. Sutural angles rounded; middle and hind tibiæ with a rather long mucro, which is dentellate near the tip.

♀. Sutural angles scarcely rounded; tibiæ unarmed.

Hab.—Pacific Coast, from Washington to Southern California.

The difference in the form of the body is perhaps sexual, as in the material examined all the males have the elytra wider behind, while in the females the sides are parallel; a condition of affairs just the reverse of what would naturally be expected.

70. **A. oblitum** Smith.—Black, moderately pubescent; the hairs more scale-like than in *rostrum*. Beak scarcely as long as the head and prothorax, rather slender, feebly dilated, attenuate, punctate about the insertion of the antennæ, polished and very sparsely punctulate from thence to tip, scarcely differing in the sexes, except that it is very slightly longer and a little less shining in the female. First joint of antennæ rather short, barely equal to the two following, second reaching the eye. Front with a feeble sulcus; eyes moderately prominent. Prothorax as long as wide, width behind the middle subequal to or a little wider than at the base; sides rounded; apical constriction and basal sinuation well marked; punctuation close but not dense and with the usual basal fovea. Elytra nearly two-thirds longer than wide; humeri moderate; sides nearly straight, except for the post-humeral sinuation, and diverging to behind the middle; surface finely rugulose; intervals flat, twice as wide as the striæ. Beneath not very coarsely, rather sparsely punctate. Length 2-2.4 mm.; .08-.095 inch.

♂. Sutural angles rounded; all the tibiæ feebly mucronate, the front pair very minutely so.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—Texas, Colorado, Nebraska.

The comparatively slender, attenuate, apically polished and subimpunctate beak, which is equal in the sexes, and the feebly armed male tibiæ are perfectly characteristic. *Capitatum* Smith is not different.

71. **A. furtivum** n. sp.—Not very robust, black, sparsely pubescent. Beak (♂) barely as long as the head and prothorax, not stout, moderately dilated, cylindrical in apical half, sparsely punctate, except about the antennal fovea; supra-antennal groove well marked; (♀) obviously longer than the head and prothorax, more slender, dilatation feebler and more basal; surface more finely, sparsely punctulate, in great part shining. Antennæ rather slender, first joint as long as (♂), or a little longer than (♀) the next two; front sulcate; eyes moderately prominent. Prothorax as long or nearly as long as wide, widest behind the middle, noticeably narrowed before the base, and somewhat constricted in front; surface moderately, coarsely, closely punctate; basal fovea deep, elongate, sometimes extending as a finer line nearly to the apex. Elytra about one-half longer than wide, widest behind the middle; humeri moderate; surface dull, finely rugose; intervals flat, nearly twice as wide as the striæ. Beneath sparsely punctate; legs rather slender. Length 1.7-1.9 mm.; .07-.08 inch.

♂. Sutural angles broadly rounded; all the tibiæ with a short mucro, that of the front tibiæ being so small as to readily escape observation.

♀. Sutural angles not rounded; tibiæ unarmed.

Hab.—Georgia.

A number of specimens in the Zimmerman collection, now deposited in the Museum of Comparative Zoology at Cambridge, bear a colored locality label which I was unable to interpret, but they are doubtless from the same region.

72. **A. commodum** n. sp.—Size, form and general appearance of *rostrum*, from which it differs in the following particulars: a little more elongate; beak more coarsely punctate; eyes smaller, less prominent; front not sulcate; prothorax less coarsely, even more densely punctate. Elytra slightly wider behind the middle; intervals wider and noticeably convex.

♂. Sutural angles rounded; all the tibiæ armed with a short mucro.

♀. Not seen.

Hab.—Montana.

A single male in the collection of the National Museum. The pubescence is entirely wanting, but probably from abrasion; the mucro of the front tibiæ is simple, that of the middle and hind tibiæ is larger and somewhat irregular. Another male in Dr. Horn's collection, also from Montana, probably belongs here, while differing by the less densely punctate thorax and flat elytral intervals.

73. **A. confertum** Smith.—Again similar to *rostrum*, but a little smaller

and more elongate; beak not notably different in the sexes, dilated and strongly attenuate, strongly punctate laterally, more finely above and toward the tip, which is polished to a greater or less extent. Front with a short sulcus, which may become obsolete. Prothorax very nearly as in *rostrum*, a trifle narrower; surface densely, a little less coarsely punctate; basal fovea profound. Elytra either parallel or decidedly wider behind the middle; intervals narrower than in *rostrum*, with a tendency to become slightly convex.

♂. Sutural angles broadly rounded; all the tibiæ armed with a short, nearly simple mucro.

♀. Sutural angles obtuse; tibiæ unarmed.

Hab.—Florida.

In all of the four examples seen the sutural stria is more strongly impressed. This species agrees with the preceding in the all around tibial armature and the strongly angulate superior margin of the antennal fossæ, both very unusual characters and not present in any of the more nearly allied species. From *commodum* it is distinguished by its smaller size, generally more parallel form, flatter elytral intervals, more slender and more strongly attenuate beak and simple tibial mucro. Both species differ notably from *rostrum* by the smaller tarsi, the second joint longer than wide and longer than the lobes of the third joint.

IV.

The species here grouped agree in having the claws toothed and the male tibiæ unarmed. The number is somewhat less than in the preceding section, exhibiting, however, a greater divergence in the minor points of structure, color and vestiture. Here will be found nearly every species (*perminutum* being the only notable exception) showing any departure from the usual black color, either in body or appendages. It is worthy of note that none of the species have the broad, shallow, frontal sulcus, so often seen in the preceding section, the nearest approach to it being in *xanthoxyli*. The presence of such a sulcus would point with reasonable certainty to Section III, in case of doubt through the absence of males. With few exceptions the species separate easily and may be distinguished as follows:

Color wholly or in part brown; male tarsi not spined.....7.
Color black; appendages often pale.
  Front coxæ (at least in the ♂) yellow.....74. **auripes.**
  Coxæ dark.....1.
1. Antennæ entirely black, or at most merely picescent at base.....4.
  Antennæ in part pale.
    Femora and tibiæ pale.....3.
    Legs black.

Front concave, or with a deep fossa adjacent to the eyes; two basal joints of antennæ pale.....75. **cavifrons.**

Front flat, without juxta-ocular excavation.

Prothorax widest at the base; first two joints and club of antennæ paler. .76. **huron.**

Prothorax widest before the base; first joint of antennæ pale.....2.

2. Beak nearly straight in basal three-fourths.....77. **varicorne.**

Beak rather strongly, evenly arcuate.

Vestiture squamiform, condensed on alternate intervals of the elytra; first joint of antennæ (♀) scarcely longer than the two following. 78. **alternatum.**

Vestiture hairy, uniform; first joint of antennæ (♀) fully as long as the three following.....79. **contusum.**

3. Thorax broadest in front of base; beak parallel, in part yellow in the ♂. 80. **nasutum.**

Thorax broadest at base; beak tapering, not differently colored in the sexes.

Beak more slender, as long as the head and prothorax (♂); punctuation beneath coarse and dense.....81. **segnipes.**

Beak stouter, shorter than the head and prothorax (♂); punctuation beneath sparser and finer.....82. **arizonæ.**

4. First joint of middle or hind tarsi of ♂ with a spiniform process on the inner side.....6.

Tarsi of ♂ not spined.

Vestiture squamiform.....83. **fumitarse.**

Vestiture hairy, at least on the elytra.

Front narrower than the tip of the beak.

Form very narrow.....84. **filum.**

Form robust or ventricose.

Pubescence sparse, uniform.....85. **ventricosum.**

Pubescence of the elytra conspicuously condensed at the base, especially on the third interval.....86. **subornatum.**

Front never narrower, usually obviously wider than the tip of the beak..5.

5. Prothorax subconical; sides nearly straight; beak strongly dilated near the base.

Legs pale.....87. **dilatatum.**

Legs black.....88. **crassum.**

Prothorax with more or less well-marked apical constriction; base not or very little wider than the middle.

Legs thin, more or less pale; beak short, stout.

Thorax stouter, beak longer; pubescence well marked. 89. **decoloratum.**

Thorax smaller, deeply constricted behind the apex; beak very short; pubescence inconspicuous.....90. **emaciipes.**

Legs dark.

Thorax arcuate at middle; tibiæ and tarsi indistinctly paler. 91. **elutipes.**

Thorax parallel in basal half; legs entirely black.

Elytral interval strongly convex; beak longer, tapering. 92. **carinatum.**

Elytral intervals feebly convex; beak shorter, parallel.
93. **attenuatum.**
Legs short, stout, entirely ferruginous; beak elongate, parallel; form rather slender ..... 94. **solutum.**
6. First joint of middle and hind tarsi armed with a spur.
Middle femora of ♂ strongly incrassate; elytra with æneous lustre; anterior femora and all the tarsi rufous..... 95. **disparipes.**
Middle femora only slightly stouter than the anterior, entirely black, without lustre..... 96. **spinipes.**
First joint of middle tarsi only armed.
Posterior margin of antennal fovea extending obliquely backward as usual.
Middle femora of ♂ noticeably stouter than the anterior.
97. **graciliforme.**
Middle femora of ♂ not incrassate.
Larger; pubescence conspicuous; humeri well developed; metasternum normal..... 98. **extensum.**
Smaller; pubescence moderate; humeri nearly wanting; metasternum shorter than the first ventral..... 99. **parallelum.**
Posterior margin of antennal fovea transverse; middle femora of ♂ not at all incrassate.
Antennæ inserted very near the base; sexual rostral disparity well marked; tarsal spine acute..... 100. **aculeatum.**
Antennæ less basal; sexual rostral disparity less marked.
Tarsal spine shorter, acute..... 101. **persimile.**
Tarsal spine long, blunt..... 102. **fibulipes.**
7. Vestiture hairy.
Beak short, stout; thorax piceo-æneous; elytra brown..103. **pyriforme.**
Beak moderately long; species entirely brown.
Color paler; pubescence uniform, size small..... 104. **lividum.**
Color darker; pubescence unevenly distributed.
Thorax feebly constricted in front, widest at base; claws feebly toothed.
Second joint of antennæ (♂), or third (♀) reaching the eye; beak dull nearly to the tip, obviously longer in the ♀; sub-apical callus of the elytra weak; size smaller..... 105. **puritanum.**
First joint of antennæ reaching the eye; sub-apical callus strong; size large..... 106. **umboniferum.**
Thorax rather strongly constricted in front, as wide or wider behind the middle than at base; claws distinctly though not strongly toothed; beak in great part polished, almost without trace of the finer sculpture in apical half, subequal in the sexes.
107. **herculanum.**
Vestiture scaly, unequally distributed, body obese..... 108. **xanthoxyli.**

74. **A. auripes** n. sp.—Moderately slender, black, front coxæ, all the femora and the front and middle tibiæ yellow, hind tibiæ and all the tarsi dusky; pubescense fine and sparse. Beak (♂) feebly curved, as long as the head and prothorax, parallel, slightly dilated at the middle, moderately punctate. Antennæ brownish, inserted near the middle of the beak, first joint scarcely as long as the next two, third not reaching the eye. Front canaliculose, slightly wider than the tip of the beak; eyes moderate. Prothorax as long as wide, cylindrical; sides dilated

a little at the middle, rather finely, moderately, closely punctate; basal fovea linear, reaching nearly to the middle. Elytra widest behind the middle; humeri rather prominent; intervals convex. Beneath moderately punctate. Length 2 mm.; .08 inch.

Hab.—Florida.

Described from a single male in the collection of Mr. Ulke. This species may be distinguished from every other in our fauna by the yellow front coxæ. It bears a remarkable resemblance to the European *assimile*, a female of which is before me; and were it not for the fact that this latter is said to have the front coxæ of the male denticulate at the apex, I should scarcely feel warranted in describing our species as distinct. Among our own species *auripes* looks much like *opacicolle*, agreeing well in the general form and feebly curved beak, with the antennæ inserted far from the base; but the pale legs and unarmed tibiæ forbid a close approximation. Its relationship with its present associates seems even more remote. It is certainly a rather aberrant form, and its position in a cabinet arrangement may be left to the judgment of those who may be fortunate enough to obtain examples.

75. **A. cavifrons** Lec.—Robust, black; pubescence fine, plentiful, clothing the beak throughout in the ♂, but wanting beyond the insertion of the antennæ in the ♀; prosternum and anterior coxæ especially densely clothed; infra-ocular fringe long and conspicuous. Beak rather strong, feebly curved, slightly tapering, scarcely at all dilated, barely longer than the prothorax (♂), a little longer but scarcely as long as the head and prothorax (♀); surface finely strigose and moderately punctate (♂); sculpture less pronounced (♀). Antennæ piceous or piceo-testaceous, two basal joints pale, first joint very little longer than the second, outer joints not transverse. Front more or less canaliculate and carinate at the middle, and either depressed from side to side between the eyes or with a well-marked juxta-ocular depression; eyes moderate. Prothorax wider than long, or occasionally as long as wide; sides divergent to the middle, thence parallel to the base; apical and basal sinuations rather feeble; surface closely, strongly punctate; basal impression linear. Elytra about one-third longer than wide, broadest behind the middle; striæ wide; intervals but little wider than the striæ, nearly flat. Beneath strongly, rather closely punctate; legs slender, first tarsal joint more than twice as long as wide, equal to the next two; claws with a moderately strong tooth. Length 2-2.5 mm.; .08-.10 inch.

Hab.—Pacific Coast, from British Columbia to Southern California.

The sutural angles are slightly rounded in the male, but the difference is not very obvious. A strongly-marked species, and with the exception of the one which follows, not at all closely related to any other. It seems to be common throughout the region in which it occurs.

76. **A. huron** n. sp.—Very close to the preceding, the description of which applies throughout, except in the following particulars: The front is never depressed below the level of the eyes, and entirely lacks the juxta-ocular fossa so characteristic of *cavifrons*. The antennal club is always more or less noticeably paler than the intermediate joints, and the tarsi are somewhat stouter. The difference in the latter respect is quite marked when compared with California specimens of *cavifrons*, but less so when compared with examples from the Puget Sound region. While it is possible that further experience may show *huron* to be worthy of no more than varietal standing, it is my conviction that the two forms are now permanently geographically isolated, and that they must soon if they have not already become distinct.

Described from one male and three females collected at Detroit and Ann Harbor, Mich., by Messrs. Hubbard and Schwarz.

Since the above was written I have seen several specimens from Illinois in Mr. Liebeck's collection.

77. **A. varicorne** Smith.—Black, often with more or less æneous lustre, rather conspicuously clothed with whitish hair, which becomes squamiform anteriorly and beneath. Beak rather slender, subcylindrical, nearly straight, about as long as the head and thorax in the ♀, obviously shorter in the ♂; base slightly thickened, clothed with scales as far as the insertion of the antennæ, thence glabrous, polished and with well-marked punctuation. First joint of antennæ yellow, nearly or quite equal to the next two, second reaching the eye, outer joints transverse. Front very little wider than the tip of the beak, with a more or less distinct, fine, median sulcus; eyes not prominent. Prothorax a little wider than long, widest a little before the base; sides rather strongly divergent, moderately arcuate; apical constriction feeble, not at all sinuate before the basal margin, which is not expanded; surface closely, strongly punctate; basal fovea small. Elytra nearly one-half longer than wide, subparallel or a little wider behind the middle; humeri not prominent; no post-humeral sinuation; striæ not deep; intervals wide, flat. Beneath rather coarsely, not very closely punctate; meso and metasternal side pieces more densely clothed; legs stout, first tarsal joint usually a little longer than wide, second as wide as long, or sometimes obviously transverse. Length 1.5-1.9 mm.: .06-.08 inch. (Pl. V, figs. 4 and 4*a*).

The sutural angles are somewhat rounded in the male.

Hab.—Georgia, Florida.

Under the name *varicorne* I have included a mass of material, from which it would be quite easy to select from diverse localities forms so varied as to make possible the definition of four or five species; but a careful study of nearly one hundred and fifty examples has thus far rendered all attempts at subdivision unsatisfactory. As further experience, however, may prove the necessity of separation, as a guide to a more definite cabinet arrangement, I indicate below the lines along which my study leads me to believe the separation will take place.

Varicorne.—The typical form above described occurs in Georgia and Florida, and differs from all western representatives by the sparser, more hair-like vestiture of the upper surface, and from *Var. a*, which it most resembles, by the prothorax more widened posteriorly.

Var. a.—Vestiture scaly, not very dense, scarcely different otherwise from the typical form, except in form of thorax above alluded to.

Hab.—Montana, Texas, New Mexico.

Var. b.—Beak (♀) more than twice as long as the prothorax; first antennal joint longer; eyes (♀) less prominent than usual. In all other forms the beak (♀) is less, usually much less, than twice the length of the prothorax, and the eyes are not appreciably less prominent in the ♀. The ♂ is scarcely distinguishable from *Var. a.*

Hab.—"North-West Territory," Nebraska, Texas, Colorado.

Var. c.—Vestiture very densely scaly; scales broader than usual; tarsi more slender and with the claw joint a little longer than in the preceding varieties.

Hab.—Arizona, California (Yuma).

Specimens from Lower California are intermediate between typical *varicorne* and *Var. a.*

78. **A. alternatum** n. sp.—Form a little less elongate than in *varicorne*. Beak moderately, strongly, nearly evenly arcuate; vestiture scaly, condensed on alternate intervals of the elytra. The latter character is easily obscured if the specimens are worn. (Pl. V, fig. 5).

So near *varicorne* that the above short diagnosis offers all that is necessary for its recognition.

I have seen many specimens, all taken by Mr. Wickham at Albuquerque, New Mexico.

79. **A. contusum** Smith.—Black, moderately pubescent. Beak (♀) rather slender, fully as long as the head and prothorax, quite strongly arcuate, parallel, a little widened at the tip, scarcely at all dilated toward the base, distinctly punctate throughout, more finely and remotely above. First joint of antennæ very long, fully equal to the next three, second reaching the eye. Prothorax slightly wider than long, widest a little behind the middle; sides rather strongly arcuate; basal margin not at all expanded; surface closely punctate, a little less so toward the middle, leaving an ill-defined, median, impunctate line; basal fovea rather small. Elytra nearly one-half longer than wide; humeri rather strong; sides noticeably divergent to behind the middle; intervals convex, a little wider than the striæ. Beneath sparsely punctate; meso and metasternal side pieces clothed with white pubescence. Legs rather slender; claws strongly toothed. Length 2.1 mm.; .085 inch.

Hab.—Dakota.

I am indebted to the kindness of Mr. Henry Ulke for an opportunity to examine the unique type, which seems never to have been duplicated. It is one of a very few species in which the thorax is

narrowed at the base without trace of sinuation or expansion of the basal margin, but is not at all closely allied to any of them The antennæ are paler toward the base, with the first joint decidedly yellow. It is possible that when the male appears this species may have to be referred to Section III.

Notwithstanding the difference in the shape of the thorax, which, however, is not very marked, I strongly suspect that *contusum* is either the female of the species I have called *spinipes*, of which only males are known, or else a somewhat aberrant female of *extensum*. There is, as yet, however, no evidence which warrants my so placing them.

80. **A. nasutum** n. sp.—Moderately robust, dull black, not at all shining; legs except knees and tarsi yellow; the tibiæ sometimes slightly infuscate; vestiture conspicuous, consisting of narrow scales or squamiform hairs, which are condensed at the base of the third elytral interval and beneath. Beak moderately stout, cylindrical, not noticeably dilated, subequal in length to the head and prothorax, rather closely and strongly punctate throughout. First joint of antennæ yellow, as long as the two following, second very nearly reaching the eye. Front but slightly wider than the tip of the beak; eyes not prominent. Prothorax nearly as long as wide, widest a little before the base; sides rounded behind the apical constriction, not sinuate before the base; surface moderately, closely punctate, the punctures more or less concealed by the vestiture. Elytra about one-half longer than wide; humeri prominent; sides subparallel, feebly arcuate; intervals rugulose, nearly flat, about twice as wide as the striæ. Beneath strongly, closely punctate; legs rather short, moderately stout. Length 2. 2.5 mm.; .08-.10 inch.

♂. Beak black and densely clothed with squamiform hairs as far as the insertion of the antennæ; tip narrowly black, intermediate portion yellow.

♀ Beak concolorous and with but few hairs at the base.

Hab.—Texas, New Mexico.

This is the only species thus far known in our fauna (there are several in Europe) which exhibits a sexual difference in the color of the beak. The females seem scarcer than the males, which have found their way in small numbers into most of the larger collections. Mr. Wickham has taken both sexes at Albuquerque, New Mexico, but apparently without recognizing their identity.

81. **A. segnipes** Say.—Robust, black; basal joints of antennæ, femora and tibiæ pale; knees dusky; vestiture conspicuous, consisting of elongate, grayish white scales or scale-like hairs, which are condensed at the bases of the third elytral intervals, on the front coxæ and on the meso and metasternal side pieces. Beak (♂) not stout, nearly straight, as long as the head and prothorax, a little thicker in basal third, noticeably attenuate beyond the rather feeble dilatation; (♀) longer and more slender; surface finely sculptured and punctate throughout in both sexes. First joint of antennæ as long as the next two (♂), or three (♀),

second joint not reaching the eye. Front punctate, not channeled; eyes rather small, not very prominent. Prothorax a little wider at base than long, subconical; apical constriction moderate; sides arcuately divergent; basal margin expanded; surface coarsely, densely punctate; basal fovea small or obsolete. Elytra parallel or feebly arcuate in basal two-thirds; humeri moderate; intervals wide, flat and subbiseriately punctate. Beneath coarsely, deeply, densely punctured. Length 2-2.6 mm.; .08-.10 inch. (Pl. V, figs. 7 and 7*a*).

Hab.—Massachusetts, District of Columbia, North Carolina, Missouri, Florida, Texas, Kansas.

The sutural angles of the elytra are plainly rounded in the male, scarcely rounded in the female. The number of pale antennal joints varies individually, being in my experience never less than two, and not infrequently as many as six or seven. Say describes it as found in seeds of *Astragalus;* Riley in seeds of *Tephrosia virginiana.* In "Ent. News," 1894, p. 141, Mr. Webster reports as follows: Adults, larvæ and pupæ found in pods of *Tephrosia virginiana,* October 5th, near Toledo, Ohio. The major portion of the larvæ had transformed in the pods—in the fields—as early as the 14th of September.

82. **A. arizonæ** n. sp.—Of the same size and general appearance as the preceding, the description of which applies sufficiently well, with the following exceptions: Form a little more robust; prothoracic and abdominal punctures finer, shallower and well separated. Beak (♂) shorter than the head and prothorax, moderately dilated a little behind the middle, rather strongly attenuate, pubescent nearly to the tip. First joint of antennæ scarcely as long as the two following, third reaching the eye. The antennæ are a little more basal in *segnipes*, and the femora are dusky at base. In the few specimens of *arizonæ* seen the femora are entirely pale, knees not darker. Female not seen. (Pl. V, fig. 8).

Hab.—Arizona.

83. **A. fumitarsæ** n. sp.—Moderately robust, black; legs pale, knees and tarsi dusky; vestiture rather conspicuous, condensed along the suture toward the base, otherwise consisting of narrow scales or scale-like hairs, which are arranged in a single, more or less regular line on each elytral interval, and arise in about equally conspicuous lines from the strial punctures. Beneath it is more decidedly scaly and denser, especially on the sternal side pieces. Beak (♀) considerably longer than the head and prothorax, slender, nearly straight in basal two-thirds, moderately dilated at basal fourth; surface rather finely punctulate in the basal region, polished and subimpunctate beyond the middle. First joint of antennæ a little shorter than the next two, third joint scarcely reaching the eye. Front scarcely wider than the tip of the beak, bisulcate, with a median carina; eyes moderately prominent. Prothorax as long as wide; sides nearly parallel from the base to the middle, thence more strongly rounded and somewhat constricted before the apex; surface moderately closely, not very coarsely punctate, with an impressed line reaching from the base to a little beyond the middle. Elytra rather strongly, longitudinally convex; humeri moderate; the intervals nearly

flat, very little wider than the striæ. Beneath moderately punctate; legs rather slender. Length 2 mm.; .08 inch. (Pl. V, fig. 6).

The unique type, from which the above description was taken, was collected by Mr. Schwarz at San Diego, in Southern Texas, and is now in the collection of the Department of Agriculture.

The superficial resemblance to a small *segnipes* is rather marked, but the color of the antennæ, with the much shorter basal joint, the shape of the rostrum, finer punctuation, more longitudinally convex elytra and difference in vestiture, show it to be abundantly distinct.

84. **A. filum** n. sp.—Very elongate, black, moderately pubescent. Beak (♀) longer than the head and thorax, slender, cylindrical, very feebly dilated near the base: the tip a little broader; surface shining; punctuation sparse, fine. First joint of antennæ equal to the two following, second reaching the eye. Front narrower than the tip of the beak, punctate, not sulcate; eyes not prominent. Prothorax subcylindrical, a little longer than wide, a little wider at one-third from the base, rather coarsely, moderately closely punctate, with elongate basal foveæ. Elytra narrow; humeri small; sides feebly arcuate, widest behind the middle; intervals feebly convex, scarcely twice as wide as the striæ. Abdomen almost impunctate; legs slender. Length 1.5 mm.; .06 inch. (Pl. V, figs. 9 and 9*a*).

Described from a single female specimen from San Borja, Lower California, in the collection of the California Academy of Sciences. In the absence of the male it cannot be certain that this species belongs in the present section. The small size, narrow form, feebly longitudinally convex elytra, narrow front and remotely punctate abdomen will, however, easily separate it from anything else in our fauna.

85. **A. ventricosum** Lec.—Form obese, black, with or without æneous lustre; pubescence moderate; beak rather stout, cylindrical, not dilated, subequal to the head and prothorax, slightly longer in the ♀; rather finely, sparsely punctate above, more coarsely subseriately at the sides; supra antennal groove more or less distinct. Antennæ slender, first joint about as long as the next two, second reaching the eye. Front narrower than the tip of the beak, not sulcate, either nearly impunctate, or with punctures arranged in two more or less regular longitudinal rows; eyes not prominent. Prothorax small, wider than long; sides feebly diverging, slightly contracted in front; surface not closely, usually somewhat irregularly, superficially punctate, a short foveate line at base. Elytra ventricose, not much longer than wide; humeri small, post-humeral sinuation lacking; sides arcuately diverging to apical two-fifths, thence more suddenly rounded to apex; intervals usually fully twice as wide as the striæ, more or less convex. Beneath rather sparsely punctate; legs slender, last tarsal joint very long, projecting beyond the lobes of the third about twice their length; claws with a small acute tooth. Length 1.4-1.8 mm.; .06 .07 inch. (Pl. V, figs. 12 and 12*a*).

Hab.—From Colorado to Texas and westward to Southern and Lower California.

In the male the sutural tips are narrowly rounded; in the female scarcely at all so. A moderate amount of variation is noticeable, chiefly in the sculpture of the beak, length of basal antennal joint and width of elytral intervals. The species is abundant on mesquite throughout the southwest.

Smith's types are from the same region as were LeConte's, and are in no way different. A female example from Columbus, Texas, in Dr. Horn's collection, has the tibiæ and tarsi pale, the beak longer, with the fourth joint of the antennæ reaching the eye. It possibly represents a new species, but until males turn up I prefer to consider it an extreme variation of the present species.

86. **A. subornatum** n. sp.—Robust, black; pubescence unevenly distributed, rather conspicuously condensed at the base of the elytra, extending on the third interval more than half-way to the middle, and in a more or less ill-defined patch behind the middle of each elytron. Beak (♂) a little shorter than the head and prothorax, parallel, rather abruptly but not widely dilated at one-fourth from the base; surface densely punctate throughout. First joint of antennæ as long as the next two, second reaching the eye. Front a little narrower than the tip of the beak, with two lines of confluent punctures, the interval between them narrow, cariniform; eyes moderate. Prothorax slightly wider than long; sides moderately divergent from apex to base, a faint subapical constriction; surface closely, not very coarsely punctate; basal fovea small. Elytra scarcely one third longer than wide; humeri prominent; sides broadly arcuate, widest at the middle; intervals flat, not much wider than the striæ. Beneath rather coarsely and closely, but not deeply punctate; legs moderate, first tarsal joint less than twice as long as wide, claw joint projecting beyond the lobes of the third, a distance equal to their length. Length 2 mm.; .08 inch.

Hab.—Texas.

Described from two males, one taken at Luling by Mr. F. S. Cate, of Wakefield, Mass., and now in his collection; the other without more definite locality from Mr. Liebeck, who has kindly allowed me to retain his unique. The sutural angles are rounded, that of the right elytron more strongly—as is usual. The vestiture, narrow front and rostral punctuation, are a combination of characters which render the identification of this species unusually easy.

87. **A. dilatatum** Smith.—Robust, strongly convex, the thorax and elytra forming a nearly continuous curve when viewed in profile, black; femora and tibiæ yellow; tarsi, tips of tibiæ and knees picescent; vestiture moderately conspicuous, consisting of rather fine whitish hairs, which are, as usual, coarser and more numerous beneath. Beak (♂) not slender, parallel, subequal to the head and prothorax, subangularly dilated over the insertion of the antennæ at

the basal third; surface scarcely shining, and rather coarsely, irregularly punctate, especially toward the base. In the ♀ the beak is a little longer and smoother, the dilatation is fully as strong as in the ♂, and at about one-fourth from the base. First antennal joint flexuose, about as long as the three following. Front scarcely wider than the tip of the beak, punctate, not sulcate, eyes not very prominent. Prothorax about as long as wide, subconical; sides nearly straight; apical and basal constrictions feeble; surface moderately closely, not coarsely punctate above, more sparsely and a little more finely at the sides; basal fovea obsolete. Elytra about one-half longer than wide; humeri moderately prominent; sides subparallel or feebly divergent in basal half; intervals flat, scarcely twice as wide as the striæ. Beneath moderately punctate; legs slender, first tarsal joint fully twice as long as wide, second longer than wide. Length 2.5-2.7 mm.; .10-.11 inch.

Specimens are not numerous in collections, and are all from Arizona.

The sutural angles are a little more noticeably rounded in the male. The strongly flexuose basal joint of the antennæ is a character worthy of especial note, and taken with the color of the legs and more slender tarsi, very readily separates this from the following species, with which alone it is at all closely allied.

88. **A. crassum** n. sp.—Robust, black; legs faintly rufescent; pubescence fine, sparse. Beak (♂) strong, subparallel, fully as long as the head and prothorax, abruptly angularly dilated over the insertion of the antennæ at the basal fourth; surface dull, coarsely, but not deeply, irregularly punctate at the sides, less coarsely above, a fine impressed line from the base to the middle. First joint of antennæ barely as long as the next two, and of the usual form, second reaching the eye. Front slightly wider than the tip of the beak, subconfluently punctate, not sulcate; eyes moderately prominent. Prothorax subconical; sides nearly straight; apical and basal constrictions obsolete; punctuation moderately close, superficial. Elytra scarcely one-half longer than wide, widest at the middle; humeri moderate; post-humeral sinus not evident; sides feebly arcuate in basal half; intervals fully twice as wide as the striæ. Beneath rather sparsely, not coarsely punctate; legs moderately stout, first tarsal joint less than twice as long as wide, second as wide as long. Length 2.8 mm.; .11 inch. (Pl. V, figs. 11 and 11*a*).

Hab.—Virginia (Penington Gap).

Described from a single male in the collection of Messrs. Hubbard and Schwarz. The sutural angles of the elytra are only slightly rounded. The rostral impressed line is unusual and possibly individual. Its relation to the preceding species has been there noticed. In addition to the differences there mentioned, it may be said that *crassum* is of stouter build throughout, less longitudinally convex, more sparsely pubescent, with shorter first antennal joint and narrower elytral striæ.

89. **A. decoloratum** n. sp.—Form moderate, black; legs pale; femora and tibiæ more or less diffusedly annulate with a darker shade; tarsi dusky; antennæ paler toward the base; pubescence well marked. Beak stout, as long or sometimes longer than the prothorax, just visibly dilated over the insertion of the antennæ and slightly narrower toward the tip; surface moderately punctate, sparsely pubescent in both sexes. First joint of antennæ not much longer than the second, obviously shorter than the two following, second about reaching the eye, outer joints transverse. Front but little wider than the tip of the beak, with two lines of punctures; eyes not prominent. Prothorax about as long as wide, about one-half wider at base than at the apex; sides feebly arcuate and subparallel in basal half, more strongly rounded in front and moderately contracted before the apex; basal margin slightly expanded; surface evenly, moderately strongly and closely punctate; basal fovea small. Elytra about one-half longer than wide; humeri moderate; sides feebly diverging to the middle; intervals flat or slightly convex, not much wider than the striæ. Punctuation beneath moderate; legs slender. Length 1.5-1.8 mm.; .06-.07 inch. (Pl. V, fig. 13).

Hab.—Massachusetts, District of Columbia, Virginia, North Carolina, Iowa, Arizona.

The sexual differences are very feeble, the beak averaging a trifle longer in the female, and the sutural angles being slightly less rounded in the same sex. In the Arizona examples the first joint of the antennæ is a little longer than described, being quite equal to the next two. Mr. Wickham has found the species in some abundance on *Desmodium* at Iowa City.

90. **A. emaciipes** n. sp. Black; legs entirely yellow, more rarely with the femora piceous; body more obese than the preceding; pubescence fine, sparse, inconspicuous. Beak very short and stout, subequal to the prothorax, evidently dilated at or just behind the middle, rather coarsely, irregularly punctate. Antennæ either pale throughout, or almost entirely piceous, proportioned as in the preceding species. Front about as before; eyes a trifle more prominent. Prothorax evidently smaller than in *decoloratum*, wider than long, very strongly constricted before the apex; surface coarsely, closely, but unevenly punctate, there being usually a small supero-latereval smooth space behind the middle. Elytra broader, with more prominent humeri, otherwise about as before. Abdomen rather coarsely, closely punctate; legs thin. Length 1.4-1.9 mm.; 056-.076 inch. (Pl. V, figs. 10 and 10a).

Hab.—New Hampshire, Massachusetts, Pennsylvania, District of Columbia, Maryland, Michigan, Illinois.

This species was confused by Smith with the preceding, from which it is readily separated by the smaller, strongly constricted thorax, which is more coarsely and unevenly punctate; stouter body; shorter, more strongly dilated and more coarsely sculptured beak and sparser pubescence, especially beneath. In addition, it may be said that the metasternum and first two ventral segments are much

more tumid, and the first joint of the anterior tarsi is noticeably more elongate. The sexes are scarcely distinguishable.

91. **A. elutipes** n. sp.—Robust, black; tibiæ and tarsi indistinctly paler; antennæ brownish at base; pubescence moderate, condensed at the base of the third elytral interval. Beak distinctly longer than the head and prothorax, cylindrical, evenly arcuate, feebly dilated near the base, rather strongly punctate throughout; supra antennal groove distinct. Antennæ not stout, first joint nearly or quite as long as the next two, and nearly reaching the eye, eighth as wide as long. Front punctate, without median sulcus; eyes moderate. Prothorax a little wider than long; sides rather strongly arcuate; basal margin expanded; apical constriction well marked, moderately closely punctate; basal fovea shallow, linear, nearly reaching the middle. Elytra about one-half longer than wide; sides feebly arcuate and subparallel in basal two-thirds; intervals flat, about one-half wider than the striæ. Abdominal punctuation moderately strong, not close, confined almost entirely to the first two segments; legs long, slender. Length 2.1 2.3 mm.; .08-.09 inch.

Hab.—Lower California (La Chuparosa).

Described from two examples, one of which, from the somewhat shorter beak and first antennal joint, I judge to be a male. *Elutipes* has no very near allies, but the tumid under body, thin legs and lack of secondary sexual characters evidently associate it with *decoloratum*, *emaciipes* and *carinatum*.

92. **A. carinatum** Smith.—Rather stout, black throughout, or with the antennæ, tibiæ and tarsi more or less brownish piceous; pubescence fine, very sparse and inconspicuous. Beak stout, a little shorter than the head and prothorax, feebly dilated at basal third, thence narrowing a little toward the tip; surface variably punctate, usually quite coarsely, often subseriately at the sides; supra antennal groove distinct. Antennæ short, first joint scarcely as long as the two following, joints 6-8 transverse, the eighth strongly so, fourth reaching the eye. Front rather narrow, deeply bisulcate; eyes not prominent. Prothorax broader than long; sides subparallel and nearly straight in basal half, thence rather strongly narrowed and constricted before the apex; surface densely, rather coarsely punctate; basal fovea moderate. Elytra about one-third longer than wide; humeri prominent; sides arcuately divergent to the middle or a little beyond; striæ coarse; intervals narrow, strongly convex. Punctuation beneath variable, usually moderately coarse and close; legs thin. Length 1.5-1.8 mm.; .06-.07 inch.

Hab.—Massachusetts, New York, Pennsylvania, Florida, Louisiana.

As in the three preceding species, secondary sexual characters are practically wanting. In the width of the eighth antennal joint and convexity of the elytral intervals this species, I think, surpasses all others in our fauna. The types of *concoloratum*, both in the National Museum and in the LeConte cabinet, are identical with the types of

carinatum in the Smith collection, now owned by the National Museum.

93. **A. attenuatum** Smith.—Moderately elongate, black; pubescence rather thin, not appreciably more conspicuous beneath, somewhat condensed at the base of the third elytral interval. Beak equal to or a little shorter than the head and prothorax, rather stout, parallel, scarcely at all dilated, coarsely more or less rugosely punctate, especially at the sides. First joint of antennæ scarcely as long as the next two, outer joints transverse, second joint usually not reaching the eye. Front very little wider than the tip of the beak, punctate, not sulcate; eyes moderate. Prothorax rather more than two-thirds the width of the elytra at humeri, as long as wide; sides subparallel and straight or feebly arcuate in basal half, thence moderately narrowed and constricted. Punctures of surface usually shallow, of moderate size and not very close, but sometimes distinctly deeper, coarser and closer; basal fovea small, linear. Elytra more than one-half longer than wide; humeri moderately prominent; sides feebly, arcuately divergent to behind the middle; intervals about one-half wider than the striæ, slightly convex. First two ventral segments moderately punctate, the others almost unpunctate; legs moderate. Length 1.7-2 mm.; .07-.08 inch.

Hab.—Michigan (Detroit), Ontario (Toronto), Illinois, Nebraska (Knaus), Texas (Brownville, Wickham), Oregon (Wickham), Southern California.

A species of wide distribution and exhibiting a moderate amount of variation in sculpture and proportion of parts. The Southern California examples especially vary from the above description in the longer, less coarsely punctate beak and more elongate basal joint of the antennæ. I do not, however, feel warranted in separating them.

94. **A. solutum** n. sp.—Elongate, parallel, black; legs red; pubescence conspicuous, condensed at the bases of the third elytral intervals. Beak rather stout, parallel, scarcely dilated, about as long as the head and prothorax (♂), somewhat longer (♀); surface finely sculptured nearly to the tip, superficially, more or less irregularly punctate throughout. Antennæ moderate, first joint about as long as the next two, second or third reaching the eye. Front substriate; eyes not prominent. Prothorax as long as wide, subcylindrical, moderately narrowed and constricted in front, the front margin somewhat thickened; surface moderately punctate. Elytra nearly twice as long as wide, about one-half wider than the prothorax; sides parallel; interval nearly flat, less than twice as wide as the striæ. Beneath not closely punctate; legs rather short, not slender. Length 2 mm.; .08 inch.

Hab.—Western Texas, New Mexico.

Described from three specimens in my own collection, kindly communicated by Captain Casey, and one each in the collections of Dr. Hamilton and Mr. Fuchs. In all the specimens the metasternum bears at the middle of the posterior margin a laterally com-

pressed tubercle. A similar structure has been noticed in *sordidum* and *curticorne*, and here, as well as in the two latter species, its presence seems independent of sex. In some examples the surface, especially of the elytra, is seen, when the pubescence is removed, to be quite highly polished; this, however, is not always the case. There are no sexual differences observable in the material at hand.

95. **A. disparipes** n. sp.—Moderately elongate, black; elytra with greenish lustre; anterior femora and all the tibiæ rufous; pubescence rather fine, not very conspicuous. Beak (♂) slender, a little shorter than the head and prothorax, cylindrical, not strongly arcuate, very feebly dilated, fine sculpture reaching nearly to the apex, which is moderately shining; punctuation rather strong and close, but not coarse. Antennæ rather short, first joint paler at base, about as long as the next two and not quite reaching the eye, 5-8 increasingly transverse, the club equal in length to the six preceding joints. Front punctate; eyes not very prominent. Prothorax a little wider than long, width a little behind the middle equal to the base; sides rather feebly arcuate behind the apical constriction; surface moderately strongly, closely punctate; basal fovea small, elongate. Elytra about one-half longer than wide, a little wider at the middle; humeri rather prominent; striæ not deep; intervals flat, at least twice as wide as the striæ. Beneath moderately punctate. Length 2 mm.; .08 inch.

♂. Sutural tips strongly rounded; first joint of middle and hind tarsi with an acute spiniform process; middle femora strongly incrassate.

♀. Not seen.

Hab.—New Mexico (Las Cruces).

Described from a single male in Dr. Hamilton's collection. Evidently allied to *spinipes*, but perfectly distinct, and withal one of the most remarkable species in our fauna.

96. **A. spinipes** n. sp.—Moderately elongate, black, rather sparsely pubescent. Beak nearly or quite as long as the head and prothorax, not stout, subcylindrical, not dilated, finely sculptured and dull almost to the apex, which is more or less shining; punctuation distinct, coarser at the sides. Antennæ more or less piceous brown at the base, first joint nearly as long as the next three, second reaching the eye. Front punctate, a little wider than the tip of the beak; eyes not prominent. Prothorax usually noticeably wider than long, sometimes as long as wide, widest in front of the base; sides moderately strongly arcuate behind the apical tubulation; punctuation moderate; basal fovea small. Elytra about one-half longer than wide, a little wider at the middle than at the humeri, which are rather prominent; intervals nearly flat or feebly convex, scarcely twice as wide as the striæ. Beneath neither coarsely nor closely punctate. Length 2 2.3 mm.; .08-.09 inch.

♂. First joint of middle and hind tarsi with a spiniform process; sutural angles rounded.

♀. Not seen.

Hab.—Arizona.

The shape of the thorax and width of the elytral intervals are subject to some variation. The middle femora are just visibly stouter. A specimen in Dr. Horn's collection bears an orange locality label (Fla.?).

97. **A. graciliforme** n. sp.—Very elongate, parallel, brown throughout, clothed not very densely with whitish scales, which are broader on the prothorax. Beak almost as long as the head and prothorax, cylindrical, feebly dilated. Antennæ stout, first joint a little paler. Prothorax a little wider than long; claws feebly toothed. Length about 1.8 mm.; .07 inch.

♂. First joint of middle tarsi armed with a spur; middle femora noticeably stouter.

♀. Not seen.

Hab,—Dakota.

Quite close to the following species, from which the above brief diagnosis will enable it to be distinguished. A single specimen in the National Museum placed with *parallelum*. The color may possibly be due to immaturity, but there are no other indications of it.

98. **A. extensum** Smith.—Elongate, black, conspicuously clothed with squamiform hairs, which are densely placed on the meso and metasternal side pieces. Beak not appreciably different in the sexes, subequal to the head and prothorax, evenly arcuate, cylindrical, not dilated and not at all attenuate when viewed laterally: surface finely strigose, except at apex; punctuation distinct, a little finer above and toward the tip. Antennæ moderately stout, picescent at base, first joint nearly as long as the three following, second reaching the eye, outer joints transverse. Front slightly wider than the tip of the beak, punctate; eyes feebly convex, not prominent. Prothorax about as long as wide, width at base about one-fourth greater than at the apex, and not greater than at just behind the middle; apical and basal constrictions evident; surface rather strongly, closely punctate; basal fovea small. Elytra narrow, subparallel: humeri small; intervals rather wide, feebly convex. Beneath deeply, rather coarsely and closely punctate; last tarsal joint projecting beyond the lobes of the third, a distance equal to their length; claws not strongly toothed. Length 2.2 mm.; ·09 inch.

♂. First joint of middle tarsi prolonged in a spiniform process on the inner side.

♀. Middle tarsi not spined.

Hab.—Dakota (Bismarck).

Four examples taken by Mr. Wickham. A very distinct and easily recognizable species.

99. **A. parallelum** Smith.—Elongate, black, moderately pubescent. Beak (♂) rather strong, subequal to the head and thorax, feebly dilated, somewhat attenuate, finely sculptured almost throughout, sparsely punctate, without supra-

antennal groove; (♀) a little longer and less attenuate. Antennæ short, first joint equal to the next two (♂), or three (♀), joints 6-8 transverse, the eighth decidedly so, second passing the margin of the eye. Front punctate, not sulcate; eyes not very prominent. Prothorax as long as wide; base barely wider than the apex; sides feebly, evenly arcuate; apical constriction obsolete; basal sinuation wanting; surface strongly, moderately, closely punctate; a median impunctate line, which is incomplete and imperfectly defined; basal fovea present. Elytra narrow, nearly or quite without humeri; intervals not wide, convex. Beneath deeply and rather coarsely and closely punctate; metasternum shorter than the first ventral; sternal side pieces quite densely pubescent; claws with a small acute tooth. Length 1.4-2 mm.; .056-.08 inch.

♂. Sutural angles narrowly rounded; first joint of middle tarsi with an acute spiniform process.

♀. Sutural angles scarcely rounded; tarsi as usual.

Hab.—District of Columbia, New Jersey (Southernpart, Liebeck), Michigan (Detroit, Schwarz), Massachusetts (Blanchard), Illinois.

In some specimens the first antennal joint is quite conspicuously paler. A remarkably distinct little species by its lack of humeri, short metasternum and male characters. It perhaps most closely resembles *tenuiforme*, which agrees in size and general facies, and in the spined male tarsi, but differs rather widely in its moderate humeri, normal metasternum, nearly simple claws and incrassate middle femora of the male. Not common.

100. **A. aculeatum** n. sp.—Not robust, dull black; front legs often more or less pallescent; pubescence yellowish cinereous, rather conspicuous. Beak (♂) not very slender, moderately curved, shorter than the head and prothorax, dull, except in about the apical third, which is somewhat shining; punctuation fine above, coarser at the sides; (♀) a little more slender, slightly longer than the head and thorax, more finely punctate, the punctures at the sides tending to a serial arrangement, somewhat dilated at the extreme base in both sexes. First joint of the antennæ subequal to the two following and nearly or quite reaching the eye. Front narrow, scarcely wider than the tip of the beak, with two confluent lines of punctures; eyes not prominent. Prothorax a little wider than long, usually slightly wider at base than at the middle; basal and apical constrictions distinct; sides arcuate at the middle; punctuation rather fine and sparse; basal fovea evident. Elytra fully one-half longer than wide, subparallel; sides feebly arcuate; humeri moderate; intervals about twice as wide as the striæ, more or less convex. Beneath finely, sparsely punctulate; legs rather slender; claws rather feebly toothed. Length 1.6 mm.; .065 inch.

♂. Sutural angles rounded; first joint of middle tarsi with spiniform process.

♀. Sutural angles scarcely rounded; tarsi not spined.

Hab.—Texas (Brownsville), Mr. Wickham.

The transverse antennal fovea is a very exceptional character, and has been noticed in but two other species, viz., *persimile* and *fibulipes*.

101. **A. persimile** n. sp.—So exactly like the following species in nearly every particular, that reference need here only be made to the two points of divergence. In *fibulipes* the tarsal spine is longer and blunt at tip, and the eyes are broadly oval as usual; in *persimile* the tarsal spine is shorter and acute, and the eyes are plainly narrowed inferiorly. (Pl. V, fig. 19).

Several examples in the Zimmerman collection and one female in Dr. Horn's collection, presumably from the same source, are all that I have seen. The specimens bear no locality label, but are, without much doubt, from the South Atlantic Coast region.

102. **A. fibulipes** n. sp.—Moderately robust, entirely black; pubescence rather conspicuous, consisting of perfectly recumbent cinereous hairs, which are more or less squamiform, especially on the head, prothorax and lower surface; on the elytra they form a single, tolerably even line on each interval. Beak (♂) rather strong, shorter than the head and prothorax, feebly dilated close to the base, slightly narrowing to the tip; apex shining, otherwise dull and moderately punctate, the punctures larger and more irregular at the sides; (♀) very slightly longer and more slender. First joint of antennæ short, not as long as the next two, second a little longer than the third, first joint not reaching the eye. Front narrow, about as wide as the tip of the beak, with two confluent lines of punctures; eyes not prominent. Prothorax about one-third wider than long, widest at the base; sides arcuate between the apical and basal constrictions; basal margin somewhat expanded; surface moderately closely, though not densely punctate; basal fovea small. Elytra about one-half longer than the thorax, less than one-half wider than long, subparallel; humeri moderate; sides feebly arcuate in basal two-thirds; intervals convex; the hairs arising from the strial punctures are generally visibly shorter and not at all squamiform. Beneath moderately punctate; claws with a small tooth. Length 1.5-1.7 mm.; .06-.07 inch. (Pl. V, fig. 18.)

♂. First joint of middle tarsi with a long blunt process on the inner side.

♀. Middle tarsi not modified.

Hab.—Lower California (La Chuparosa).

There is not much sexual difference in the elytral tips. In addition to the differences stated in the table between this species and *aculeatum*, it may be added that the present species is considerably more robust, and the vestiture of the elytra consists of only a single line of stouter hairs on each interval, while in *aculeatum* the hairs are finer and more numerous. The two species are, however, closely related as is evident by the narrow front, feebly toothed claws, peculiar sexual characters, and a general similarity in form, size, sculpture and vestiture. The resemblance to *persimile* is excessively close, the difference being alluded to under that species.

103. **A. pyriforme** Smith.—Moderately robust, wider behind, æneopiceous; elytra reddish brown; suture darker; pubescence whitish, moderately conspicuous, condensed at the bases of the third elytral intervals and in a post-scutellar sutural spot, forming a more or less evident triangle. Beak thick, shorter than the head and prothorax, punctate and pubescent. Antennæ rather slender, first joint subequal to the next two, second about reaching the eye. Front narrower than the tip of the beak, with the two lines of punctures, which tend to coalesce; eyes not prominent. Prothorax as long as wide, subcylindrical, a little wider behind, moderately punctate, with a linear basal fovea. Elytra widening to behind the middle; humeri not prominent; striæ coarse; intervals rather strongly convex, wider than the striæ. Beneath moderately punctured; claws with a rather small tooth. Length 1.6-2 mm.; .065-.08 inch. (Pl. V, fig. 17).

Hab.—Arizona.

The females differ only by the slightly more slender, less pubescent beak. The peculiar coloration will at once separate *pyriforme* from anything else in our fauna. It seems thus far not to have been brought in by many of our collectors, all the specimens seen coming apparently from one source.

104. **A. lividum** Smith.—Ferruginous; legs yellowish; pubescence fine, sparse, yellowish. Beak (♂) a little shorter than the head and prothorax, feebly dilated at base and slightly narrowing toward the tip; (♀) as long as the head and prothorax, more slender, sparsely punctulate in both sexes, but smoother in the female. Antennæ inserted near the base, first joint but little longer than the second and nearly reaching the eye. Front narrower than the tip of the beak, with two lines of more or less confluent punctures: eyes rather prominent, more coarsely granulate than usual. Prothorax a little wider than long; sides just visibly converging to a little before the middle, then more suddenly narrowed and strongly constricted before the apex: surface moderately closely punctate; basal fovea small, punctiform. Elytra one-half longer than wide: humeri moderate; sides subparallel; intervals not much wider than the striæ, more or less convex. Beneath moderately punctate; legs slender. Length 1.6-1.8 mm.; .06-.07 inch.

Hab.—Florida.

Taken in some numbers, especially at Crescent City, by Messrs. Hubbard or Schwarz. In his description Smith compares this species with *turbulentum* on a basis of similarity in form. This is only true in a very superficial sense, as structurally there is little affinity between them. Though not very close, *lividum* must, by any scheme, be placed in the vicinity of *emaciipes* and *carinatum*; its separation from these species here being merely for convenience in tabular arrangement. Its color will always be sufficient for its instant recognition.

105. **A. puritanum** n. sp.—Moderately elongate, wider behind, brown; the suture slightly darker; vestiture consisting for the most part of grayish hairs, which are coarser and condensed in the basal and apical regions, more especially in a curved line, posteriorly convex on each elytron before the middle, and in a transverse subapical band, between these the hairs are very fine and sparse, presenting the appearance of a wide median denuded fascia. In some examples the entire region behind the apical band is densely clothed with grayish white pubescence, with yellowish and reddish hairs intermixed. The sides of the meso and metasternum, as well as their side pieces, are also densely clothed in well-preserved examples. The beak is shorter than or equal to the head and prothorax (♂), distinctly longer (♀), parallel, feebly dilated, finely sculptured and rather dull nearly to the tip in both sexes. First antennal joint subequal to the next two (♂), or a little longer (♀), second (♂) or third (♀) reaching the eye. Front more or less canaliculate; eyes prominent. Prothorax nearly as long as wide, slightly wider behind; apical constriction feeble; basal almost wanting; surface moderately punctate; basal fovea small, elongate. Elytra about one-half longer than wide, widest behind the middle; humeri moderate; intervals not wide, somewhat convex. Beneath moderately punctate; tarsi rather stout; claws feebly toothed. Length 2.-2.4 mm.; .08–.096 inch. (Pl. V, fig. 16.)

Hab.—Massachusetts, Pennsylvania, New Jersey, District of Columbia, Illinois, Wisconsin.

There seems to be no sexual difference, other than in the length of the rostrum, nor in my experience is the abdomen ever deplexed at the tip in the male. The relation of this species to *herculanum* is referred to under that species.

106. **A. umboniferum** n. sp.—Of the same general facies as the preceding, but larger and a little more elongate. The beak is slightly more shining, the antennæ inserted nearer the base, the first joint reaching the eye. The sides of the thorax are a little more arcuate posteriorly, with a larger but shallow basal fovea. The base of the elytra is more diffusedly clothed with pale hairs, which are not so obviously condensed at the base of the third interval, or along the suture, as is respectively the case in the preceding and following species. The sides of the body beneath are less densely pubescent, the elytral intervals are wider, and the fifth bears on the declivity a prominent callus. Length 3.-3.1 mm.; .12 inch.

Only five examples seen, and all from Maryland (Odeuton and Harper's Ferry).

There are no sexual differences observable, though it is probable that both sexes are present.

107. **A. herculanum** Smith.—Similar to the two preceding in general appearance, but differing from both by the rather strongly rounded sides of the prothorax, the shining beak and more strongly toothed claws. There are absolutely no external means of distinguishing the sexes. Length 2.5-2.9 mm.; .10-.12 inch. (Pl. V, fig. 15.)

Hab.—Massachusetts, New York, Pennsylvania, Michigan, West Virginia.

According to Dr. Hamilton, sometimes abundant in Western Pennsylvania "on *Viburnum acerifolium* going out of bloom, June."

For convenience of comparison I give below, in parallel columns, the characters of most use in the separation of the last three species:

Puritanum.	*Umboniferum.*	*Herculanum.*
Length 2-2.4 mm.;	3-3.1 mm.;	2.5-2.9 mm.
Beak conspicuously longer in the ♀, often shorter than the head and prothorax in the ♂;	Beak subequal? (sexes not yet separated);	Beak subequal in the sexes.
surface finely strigoso reticulate and dull almost throughout;	fine sculpture rather less marked; surface a little more shining;	fine sculpture scarcely evident, except near the base; surface polished and shining;
color piceous brown throughout.	color piceous brown throughout.	color reddish brown; base and extreme tip darker.
Second joint of antennæ (♂). third (♀) reaching the eye.	First joint of antennæ reaching the eye.	Slightly variable, first joint nearly but never quite reaching the eye.
Prothorax nearly as long as wide, widest at base; apical constriction feeble, behind which the sides are nearly straight.	Prothorax somewhat intermediate in shape, but never with a well-marked basal contraction.	Prothorax more transverse; apical constriction distinct; sides well rounded and narrowed before the base, which is not wider, if as wide, as near the middle.
Basal fovea small, narrow.	Basal fovea much larger, shallow, more vague.	Basal fovea as in *puritanum*.
Elytra less elongate.	Elytra more elongate.	Elytra less elongate.
Pubescence most noticeably condensed at base on third interval.	Pubescence more diffuse at base, not conspicuously condensed on either the sutural or third interval.	Pubescence most noticeably condensed at base along the suture.
Darker subapical sutural spot not or scarcely evident.	Subapical sutural spot conspicuous.	Subapical sutural spot conspicuous.
Posterior callus feeble or wanting.	Posterior callus prominent.	Posterior callus feeble.
Claws feebly toothed.	Claws feebly toothed.	Claws more strongly toothed.

The color is, in some degree, variable in all, but *puritanum* is, as a rule, darker than the other two. I am well aware that the creating of two new species at the expense of *herculanum* will seem to some of doubtful propriety, and I must confess that I hesitated long

before deciding on the course here pursued. It were certainly much simpler to set everything down to variation of one sort or another, but the differences seem too many and too constant to justify such a proceeding. A careful study of localities and dates in the large material at hand shows, that with a solitary exception, there has been no instance of the taking of any two forms at the same time and place; the single exception being the occurrence of a specimen each of *umboniferum* and *herculanum* on the same day, May 19th, at Harper's Ferry, West Virginia, a fact which may signify relationship or the reverse, according to circumstances.

108. **A. xanthoxyli** n. sp.—Very robust, strongly gibbous when viewed in profile, brown, clothed throughout with whitish, pale brown and blackish scales, which are unevenly distributed upon the elytra. Beak not very stout, subequal in length to the head and prothorax, rather prominently, but not very strongly dilated near the base, slightly attenuate beyond the dilatation; surface more or less shining, moderately punctate about the insertion of the antennæ, more finely and remotely toward the tip, which is polished. Antennæ stout, inserted near the base, first joint as long as the next two and reaching the eye, eighth transverse. Front with two rows of punctures and a more or less evident channel between them; eyes prominent, the vertical diameter exceeding the horizontal more than is usual. Prothorax a little wider at the base than long, conical; sides nearly straight; a feeble apical constriction; surface not very closely nor coarsely punctate; basal fovea wanting. Elytra strongly, longitudinally convex, more suddenly declivous behind, not much longer than wide; humeri strong; sides somewhat diverging to the middle; striæ coarse; intervals about one-half wider, nearly flat at their summits; vestiture condensed in a basal area, reaching the humeral umbones and emarginate at the suture; the scales pale brownish, whiter along the posterior border; on the second, fourth and sixth intervals there are small condensed spots of pale scales, forming a transverse row behind the middle, between which and the basal patch the scales are blackish; the first, third and fifth intervals, as well as the sides and apex, are clothed with brownish white scales, varying slightly in shade. Beneath rather sparsely punctate; legs short, stout, first tarsal joint as wide as long, second transverse; claws with a rather blunt tooth. Length 1.8-2.1 mm.; .07-.084 inch. (Pl. V, figs. 14 and 14*a*.)

Hab.—Texas (Brownsville and San Diego).

Numerous specimens were taken by Mr. Schwarz at San Diego, where it was found breeding in the seeds of *Xanthoxylum pterota*. The sexes are scarcely separable. A very peculiar species and quite unlike anything else in our fauna, though evidently allied to certain tropical American forms, more especially to *A. gibbosum* Sharp, of Mexico.

I have been pleased to use the specific name suggested by Mr. Schwarz.

The original descriptions (except in *nodirostre* and *vile*, where Smith's translations are used) of the unrecognized species are here appended:

A. nodirostre Gerst., Stett. Ent. Zeit., 1854, 261.—Oblong, black, subæneous, slightly pubescent; rostrum dilated near middle, above canaliculate; front trisulcate; antennæ short, stout. Head grossly punctured; thorax subcylindrical, narrowed anteriorly, finely punctured, as long as broad, sides equal; elytra black, æneous, striate and punctured; interstices subconvex and shining; humeri prominent; legs piceous. Length 1-1½ lines.

Hab.—Florida.

A. vile Gerst., loc. cit., 249.—Elongate, black, not pubescent, shining; rostrum elongate, slightly arcuate, densely punctate at base; antennæ inserted close to the eyes, base piceous. Head finely granulate, sulcate between the eyes; eyes small, not prominent; thorax nearly as wide as long; side parallel, slightly narrower at apex; base bisinuate, sparsely punctate, foveate at base; elytra elongate, ovate; at base one-half broader than thorax; sides parallel to terminal third; striæ punctate; intervals convex, finely scabrous; legs black, thin; anterior tibia elongated. Length ⅓ line.

Hab.—Baltimore.

A. subglobosum Gerst., loc. cit., p. 243.—Breve, obscure æneum, subtilissime griseo pubescens, rostro breviore, arcuato, fronte canaliculato, thorace transverso, lateribus ampliato, apicem versus attenuato, postice bisinuato, supra minus crebre punctato, canaliculato, elytris subglobosis, punctata sulcatis, interstitiis convexis; subtiliter punctulatis. Long. (rostr. excl.) ⅓ lin.

Der Körper ist kurz und gedrungen, schwarz, sehr fein und sparsam, graw behaart, die oberseite dunkel erzfarbig. Der Rüssel ist ziemlich kurz, gebogen, sehr fein und sparsam punktirt, matt glänzend. Die Fühler sind dicht vor den Augen dicht und tief punktirt, in der Mitte mit einer deutlichen Längsrinne; die Augen sind gross und ziemlich hervortretend. Das Halsschild ist um ein Drittheil kürzer als an der Basis breit, an den Seiten nach hinten gerundet erweitert vorn verengt und eingeschnürt, aus Hinterrande zweibuchtig; die oberfläche nicht sehr dicht und etwas nuregelmässig punktirt, vor dem Schildchen mit einer abgekürzten Mittelrinne. Das Schildschen ist klein, rundlich. Die Flügeldecken sind kurz und breit, fast kugelartig gewölbt, an den Seiten gerundet erweitert, nach hinten schnell verengt und abgerundet, doch so, dass von oben gesehen die Spitze etwas aus dem Kreisbogen nach hinten hervotritt; die oberfläche ist tief punktirt gefurcht, die Zwischenräume deutliche gewolbt, sehr fein punktirt. Die Beine sind massiglang und stark, schwarz, fein behaart.

Aus Nordamerika (Mus. Berol.).

A. cuprescens Mann., Bull. Mosc., 1843, 289.--Oblongum, fusco æneum, griseo pubescens, rostro lungitudine thoracis cum capite, arcuato, thorace anterius angustato, profunde punctato, postice canaliculato; elytris oblongo ovatis, punctato sulcatis, punctis, in sulcis satis approximatis. Longit. cum rostro 1½ lines, Latit. ½ lin.

Hab —In insula Sitkha.

A. reconditum Gyll., Sch. Curc., V, 432.—Oblongo ovatum, nigro æneum, subnitidum glabrum; thorace sub-conico, obsolete punctato, non canaliculato; elytris amplis, remote punctato sulcatis; interstitiis planis, sublævibus; rostro tenui arcuato. Rostrum longius magis tenue arcuato, cuput breve, latum, atrum, fronte impressa punctulata, vertice elevato sublævi; oculi semi-globosi, nigri; rostrum longitudine capite cum thoracis tenue, cylindricum, atrum nitidum. Antennæ mediocres, nigræ. Thorax latitudine baseos fere longior, anterius angustior, sub-conicus, apice truncatus lateribus obliquus vix ampliatus; basi leviter bisinuatus, supra modice convexus, obsolete punctatus, postice non canaliculatus nigro æneus, subnitidus; scutellum tuberculiforme, atrum. Elytra ampla, antice thoracis basi fere duplo latiore, humeris rotundatis, calloso elevato instructis; lateribus pone medium adhuc nonnihil latioribus, apice conjunctim rotundato, thorace triplo longiora, supra convexa sat profunde sulcata, sulcis remote punctatis, atrum, parum nitidum. Pedes longiusculi, validi, atri, tarsis cinereo pubescentibus.

Hab.—Pennsylvania.

PODAPION.

This genus was erected by Prof. Riley, Bull. Brooklyn Ent. Soc., VI, p. 61, for the reception of a singular Apionid bred from galls on two-year old twigs of *Pinus inops*. For a description of this insect (*P. gallicola* Riley) and its habits, the student should consult the above reference.

The structural characters used as a basis for generic separation by Prof. Riley are slight, as he virtually admits when he says "Where such uniformity obtains in a group (Apioninæ), characters may be considered generic which otherwise would have doubtful generic value." The greater width of the tarsal joints seems to have been the chief character relied upon, and this, indeed, is the only one mentioned by Prof. Smith in his Synopsis. Further experience shows that this distinction does not hold good; the proportions of the tarsal joints in *Apion* vary widely, and in one species at least, *A. xanthoxyli*, the joints are quite as strongly dilated as in *gallicola*. *Podapion* does, however, depart so much in size and general facies from all the rest of our *Apionids* that much less radical structural divergence is necessary than if habital peculiarities were slight or wanting; and while the tarsi fail to yield the evidence desired, I have observed two other differences which seem to me to meet the requirements.

In *Podapion* the antennal club is relatively very small, with the last joint much shorter than either of the two preceeding. In *Apion* the last joint of the club is always distinctly longer than the one preceding and constitutes at least one-third the length. Again, the front thighs are conspicuously stouter than the others in *Podapion*, never so in *Apion* (the peculiar sexual modifications of the front thighs of certain males of Section I cannot properly be cited as an exception). It may be said that the middle coxæ are more narrowly separated than usual, though certain species of *Apion*, e. g. *herculanum*, approach it in this respect. The claws are nearly simple, there being merely a slight basal angulation, which is more evident in the anterior pair. There seem to be no sexual differences, except the very slightly longer and smoother beak of the female.

Mr. Blanchard writes me that he has beaten *Podapion* from pitch pine, *Pinus, rigida*, on which it had undoubtedly bred; *P. inops* not occurring there (Lowell, Mass.).

Specimens are recorded from District of Columbia, Massachusetts, Michigan. Smith also adds H. B., Arkansas, Florida.

Since writing the above I have seen a specimen from California (Placer County), in the collection of Mr. Van Dyke, of Soldiers' Home, California. Truly an insect of extraordinary distribution.

Bibliography and Synonomy.

APION Hbst.

1. **A. erraticum** Smith., Trans. Am. Ent. Soc., 1884, p. 44; *estriatum* ♀ Smith, loc. cit., p. 47.
2. **A. impeditum** n. sp.
3. **A. quadricolle** n. sp.
4. **A. protensum** Lec., Pac. R. R. Expl. and Surveys Ins. 53; Smith, loc. cit p. 46.
5. **A. impunctistriatum** Smith, loc. cit., p. 48.
6. **A. coracellum** n. sp.
7. **A. anceps** n. sp.
8. **A. atripes** Smith, loc. cit., p. 49.
9. **A. finitimum** n. sp.
10. **A. virile** n. sp.
11. **A. melanarium** Gerst., Stett. Ent. Zeit, 1854, p. 261; Smith, loc. cit., p. 50.
12. **A. floridanum** Smith, loc. cit., p. 49.

13. **A. robustum** Smith, loc. cit., p. 45; *obesum* ♀ Smith, loc. cit., p. 49.
14. **A. obsoletum** Smith, loc. cit., p. 44; *ovale* ♀ Smith, loc. cit., p. 47.
15. **A. ellipticum** Smith, loc. cit., p. 51.
16. **A. desolatum** Smith, loc. cit., p. 48.
17. **A. sinuirostrum** n. sp.
18. **A. molestum** n. sp.
19. **A. minutum** Smith, loc. cit., p. 50; *parvulum* Smith, loc. cit., p. 49.
20. **A. texanum** Smith, loc. cit., p. 51.
21. **A. pennsylvanicum** Boh., Sch. Curc., V, 417; Smith, loc. cit., p. 50; *erythrocerum* Smith, loc. cit., p. 44.
22. **A. funereum** n. sp.
23. **A. occidentale** n. sp.
24. **A. hesperum** n. sp.
25. **A. perminutum** Smith, loc. cit., p. 59.
26. **A. reclusum** n. sp.
27. **A. punctinasum** Smith, loc. cit., p. 46.
28. **A. curticorne** n. sp.
29. **A. sordidum** Smith, loc. cit., p. 48; var. *californicum* Smith, loc. cit., p. 52; *vespertinum* Casey, Bull. Brooklyn Ent. Soc., Vol. VII, p. 67.
30. **A. tenuiforme** n. sp.
31. **A. acrophilum** n. sp.
32. **A. antennatum** Smith, loc. cit., p. 53.
33. **A. œdorhynchum** Lec., Proc. Acad. Nat. Sci., Phila., 1858, p. 78; Smith, loc. cit., p. 50.
34. **A. opacicolle** Smith, loc. cit., p. 50.
35. **A. coxale** n. sp.
36. **A. tenuirostrum** Smith, loc. cit., p. 62.
37. **A. æneipenne** Smith, loc. cit., p. 61.
38. **A. impexum** n. sp.
39. **A. metallicum** Gerst., Stett. Ent. Zeit., 1854, p. 243; Smith, loc. cit., p. 61.
40. **A. troglodytes** Mann., Bull. Mosc., 1843, II, p. 289; Smith, loc. cit., p. 61.
41. **A. propinquicorne** n. sp.
42. **A. modestum** Smith, loc. cit., p. 58.
43. **A. subtinctum** n. sp.
44. **A. pervicax** n. sp.
45. **A. gulare** n. sp.
46. **A. proclive** Lec., Pac. R. R. Expl. and Surveys, Ins. 53; Smith, loc. cit., p. 58.
47. **A. chuparosæ** n. sp.
48. **A. grossulum** n. sp.
49. **A. patruele** Smith, loc. cit., p. 64.
50. **A. walshii** Smith, loc. cit., p. 57; *lanuginosum* || Walsh, Proc. Ent. Soc., Phila., 1867, p. 269; *vicinum* Smith, loc. cit., p. 58.
51. **A. abdominale** Smith, loc. cit., p. 53.
52. **A. perforicolle** n. sp.
53. **A. novellum** n. sp.
54. **A. nebraskense** n. sp.
55. **A. minor** Smith, loc. cit., p. 56.
56. **A. turbulentum** Smith, loc. cit., p. 56.
57. **A. importunum** n. sp.

58. **A. griseum** Smith, loc. cit., p. 59; *fraternum* Smith, loc. cit., p. 60.
59. **A. dolosum** n. sp.
60. **A. æquabile** n. sp.
61. **A. carinirostrum** n. sp.
62. **A. peninsulare** n. sp.
63. **A. cribricolle** Lec., Pac. R. R. Expl. and Surveys, Ins. 53; *brevicolle* Smith, loc. cit., p. 53.
64. **A. porcatum** Boh., Sch. Curc., V, p. 374; Smith, loc. cit., p. 64.
65. **A. centrale** n. sp.
66. **A. rostrum** Say, Jour. Acad. Nat. Sci. Phila., V, 253; ed. Lec., II, p. 316; Curc., p. 6; ed. Lec., I, p. 264; *Sayi*, Gyll., Sch. Curc., I, p. 252; Harris, Inj. Insects, ed. ult. (larva); Smith, loc. cit., p. 63.
67. **A. coloradense** n. sp.
68. **A. nigrum** Hbst., Käfer, VII, p. 122, pl. 103, fig. 11; Germar, Magazin, II, p. 239; Gyll., Sch. Curc., I, p. 254; Smith, loc. cit., p. 64.
69. **A. cordatum** Smith, loc. cit., p. 54.
70. **A. oblitum** Smith, loc. cit., p. 54; *capitatum* Smith, loc. cit., p. 54.
71. **A. furtivum** n. sp.
72. **A. commodum** n. sp.
73. **A. confertum** Smith, loc. cit., p. 63.
74. **A. auripes** n. sp.
75. **A. cavifrons** Lec., Pac. R. R. Expl. and Surveys, Ins. 53; Smith, loc. cit., p. 63.
76. **A. huron** n. sp.
77. **A. varicorne** Smith, loc. cit., p. 60.
78. **A. alternatum** n. sp.
79. **A. contusum** Smith, loc. cit., p. 61.
80. **A. nasutum** n. sp.
81. **A. segnipes** Say, Curc., p. 6; ed. Lec., I, p. 264; Smith, loc. cit., p. 59.
82. **A. arizonæ** n. sp.
83. **A. fumitarse** n. sp.
84. **A. filum** n. sp.
85. **A. ventricosum** Lec., Proc. Acad., 1858, p. 78; Smith, loc. cit., p. 55; *typicum* Smith, loc. cit., p. 53.
86. **A. subornatum** n. sp.
87. **A. dilatatum** Smith, loc. cit., p. 56.
88. **A. crassum** n. sp.
89. **A. decoloratum** Smith, loc. cit., p. 52.
90. **A. emaciipes** n. sp.
91. **A. elutipes** n. sp.
92. **A. carinatum** Smith, loc. cit., p. 52; *concoloratum* Smith, loc. cit., p. 52.
93. **A. attenuatum** Smith, loc. cit., p. 62.
94. **A. solutum** n. sp.
95. **A. desparipes** n. sp.
96. **A. spinipes** n. sp.
97. **A. graciliforme** n. sp.
98. **A. extensum** Smith, loc. cit., p. 61.
99. **A. parallelum** Smith, loc. cit., p. 47.
100. **A. aculeatum** n. sp.

101. A. **persimile** n. sp.
102. A. **fibulipes** n. sp.
103. A. **pyriforme** Smith, loc. cit., p. 57.
104. A. **lividum** Smith, Entom. Amer., 1887, p. 56.
105. A. **puritanum** n. sp.
106. A. **umboniferum** n. sp.
107. A. **herculanum** Smith, loc. cit., p. 56.
108. A. **xanthoxyli** n. sp.

Unidentified species.

A. **nodirostre** Gerst., Stett. Ent. Zeit., 1854, p. 261.
A. **vile** Gerst., ibid., p. 249.
A. **subglobosum** Gerst., ibid., p. 243.
A. **cuprescens** Mann., Bull. Mosc., 1843, p. 289.
A. **reconditum** Gyll., Sch. Curc., V, 432.

EXPLANATION OF PLATE II.

Fig. 1.—*A. erraticum*; 1*a*, basal joints of antennæ ♂ ♀.
" 2.—*A. quadricolle*; 2*a*. " " " " ♀.
" 3.—*A. impunctistriatum*; 3*a*, antennæ ♂.
" 4.—Left anterior femur as seen from above of *A. impeditum* ♂.
" 5.— " " " " " *A. impunctistriatum* ♂.
" 6.— " " " " " *A. finitimum* ♂.
" 7.— " " " " " *A. melanarium* ♂.
" 8.— " " " " " *A. desolatum* ♀.
" 9.— " " " " " *A. pennsylvanicum* ♂.
" 10.— " " " " " *A. occidentale* ♂.
" 11.—Anterior femur of any female of Section I.
" 12.—Abdomen coarsely, closely punctate—*A. erraticum, impeditum*, etc.
" 13.—Abdomen more sparsely, finely punctate—*A. atripes, melanarium*, etc. The difference is not always so strongly marked as in the figures.
" 14.—Anterior tibia ♂, usual form, Section I.
" 15.— " " of *finitimum* ♂.
" 16.— " " of female, practically the same in all species.
" 17.—Posterior tibiæ ♂, usual form, Section I. The female differs only in lacking the mucro.
" 18.—*A. atripes*.
" 19.—Claw of *A. impunctistriatum*.
" 20.—Same of *A. funereum*.
" 21.—*A. sinuirostrum*.
" 22.—*A. melanarium*.
" 23.—*A. hesperum*.
" 24.—Tip of elytra (♂ ♀) of *A. pennsylvanicum*.
" 25.—*A. occidentale*.

EXPLANATION OF PLATE III.

Fig. 1.—*A. perminutum:* 1*a*, basal joints of antennæ.
" 2.—*A. reclusum;* 2*a*, " " " ♂.
" 3.—*A. punctinasum* ♂; 3*a*, tarsus.
" 4.—*A. curticorne;* 4*a*, head and antennæ (♀) of same.
" 5.—*A. tenuiforme;* 5*a*, middle tarsus ♂.
" 6.—*A. sordidum;* 6*a*, tarsus.
" 7.— " var. (Arizona).
" 8.— " var. *californicum:* 8*a*, tarsus.
" 9.—*A. œdorhynchum* ♂.
" 10.—*A. antennatum* ♂.
" 11.—Front tibia of *antennatum* ♂.
" 12.— " " *acrophilum* ♂.
" 13.—Claw of *reclusum, punctinasum*, etc.
" 14.— " " *perminutum, acrophilum*, etc.
" 15.— " " *œdorhynchum* and *antennatum*.

EXPLANATION OF PLATE IV.

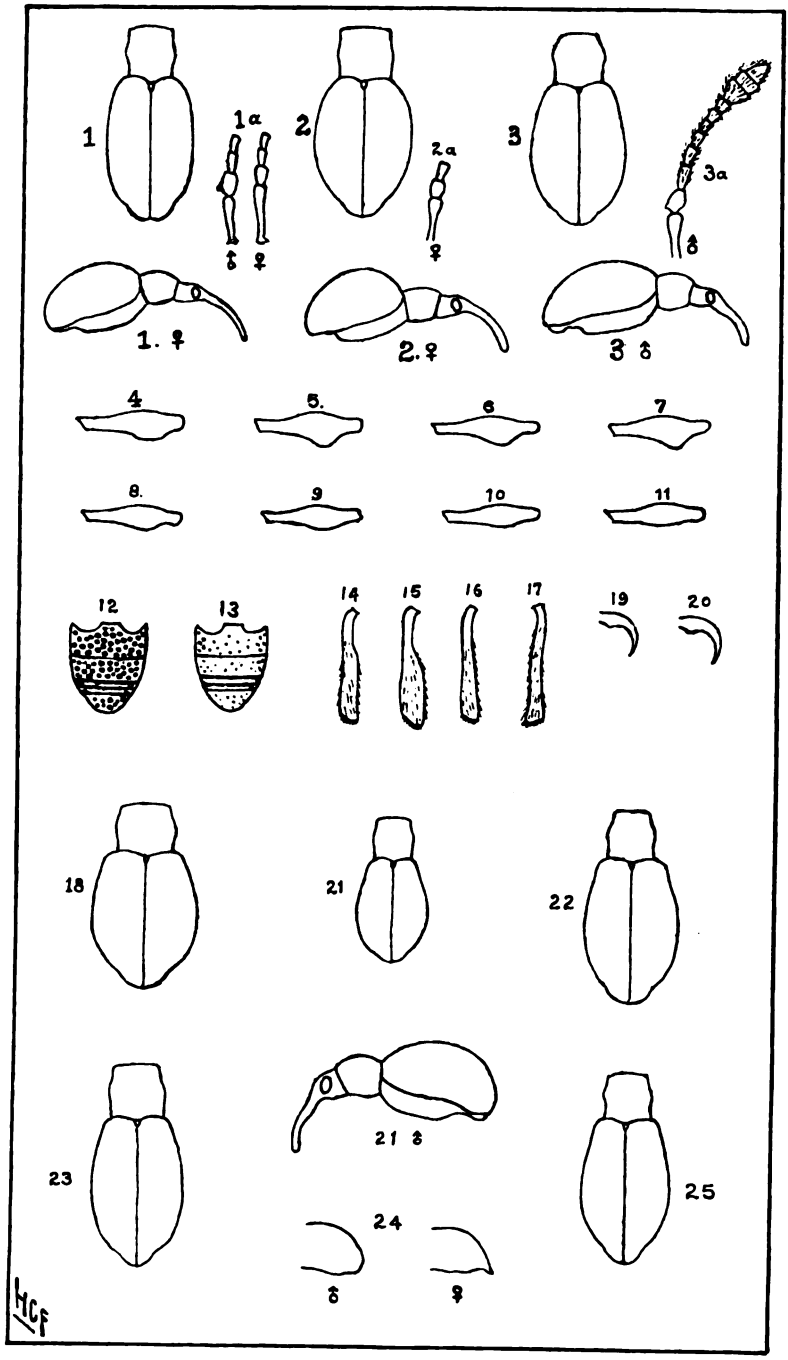
Fig. 1.—Prothorax not sinuate before the basal margin (*A. tenuirostrum*).
" 2.—Prothorax sinuate posteriorly; base as wide or wider than the middle (*A. pervicax*).
" 3.—Prothorax sinuate posteriorly; base narrower than the middle (*A. cordatum*).
" 4.—Usual shapes of claws in Section III.
" 5.—Thorax of *A. metallicum.*
" 6.— " " *A. troglodytes.*
" 7, 7*a*.—*A. propinquicorne* ♂.
" 8, 8*a*.—*A. modestum* ♂.
" 9, 9*a*, 9*b*.—*A. proclive* ♂.
" 10.—Head of *A. minor* ♂; 10*a* same ♀.
" 11, 11*a*.—*A. patruele* ♂.
" 12, 12*a*.—*A. walshii* ♂; 12*b* head ♀.
" 13.—*A. abdominale.*
" 14.—Mucro of posterior tibia ♂, *A. pervicax.*
" 15.— " " " *A. proclive.*
" 16.— " " " *A. chuparosæ.*
" 17.— " " " *A. patruele.*
" 18.— " " " *A. walshii.*
" 19.— " " " *A. novellum.*
" 20.— " " " *A. nebraskense.*
" 21.—Posterior margin of antennal fovea angulate.
" 22.— " " " " not angulate.

EXPLANATION OF PLATE V.

Fig. 1.—*A. perforicolle.*
" 2, 2*a*.—*A. peninsulare.*
" 3, 3*a*.—*A. cribricolle.*
" 4.—Head and beak of *A. varicorne* ♂; 4*a* same of var. b, ♀.
" 5.— " " " " *A. alternatum.*
" 6.—*A. fumitarse* ♀.
" 7.—*A. segnipes* ♀; 7*a* same head and beak ♂.
" 8.—Head and beak of *A. arizonæ* ♂.
" 9, 9*a*.—*A. filum.*
" 10.—*A. emaciipes;* 10*a* thorax of same.
" 11.—Thorax of *A. crassum;* 11*a* beak of same from above.
" 12, 12*a*.—*A. ventricosum.*
" 13.—Thorax of *A. decoloratum.*
" 14, 14*a*.—*A. xanthoxyli.*
" 15.—*A. herculanum.*
" 16.—*A. puritanum.*
" 17.—*A. pyriforme.*
" 18.—First joint of middle tari ♂, *A. fibulipes.*
" 19.— " " " " *A. persimile.*

ERRATA.

Page 106, line 25, for Herbst-Käfer *read* Herbst, Käfer.
" 112, lines 5 and 6, move one em to right
" 112, lines 7 and 9 from bottom, move four ems to right.
" 112, line 26, for nor *read* not.
" 112, lines 26, 28-33, move one em to right.
" 113, line 4, move two ems to left.
" 124, line 24, for subdental *read* subdentate.
" 124, line 32, after generally *add* not.
" 129, line 4, for dipterousgal ls *read* dipterous galls.
" 129, line 29, after otherwise *add* as.
" 132, lines 7 and 8, move two ems to right.
" 132, lines 1, 3 and 4 from bottom, move two ems to right.
" 147, line 8, add a comma after southeast.
" 166, line 1, for n. sp. *read* Smith.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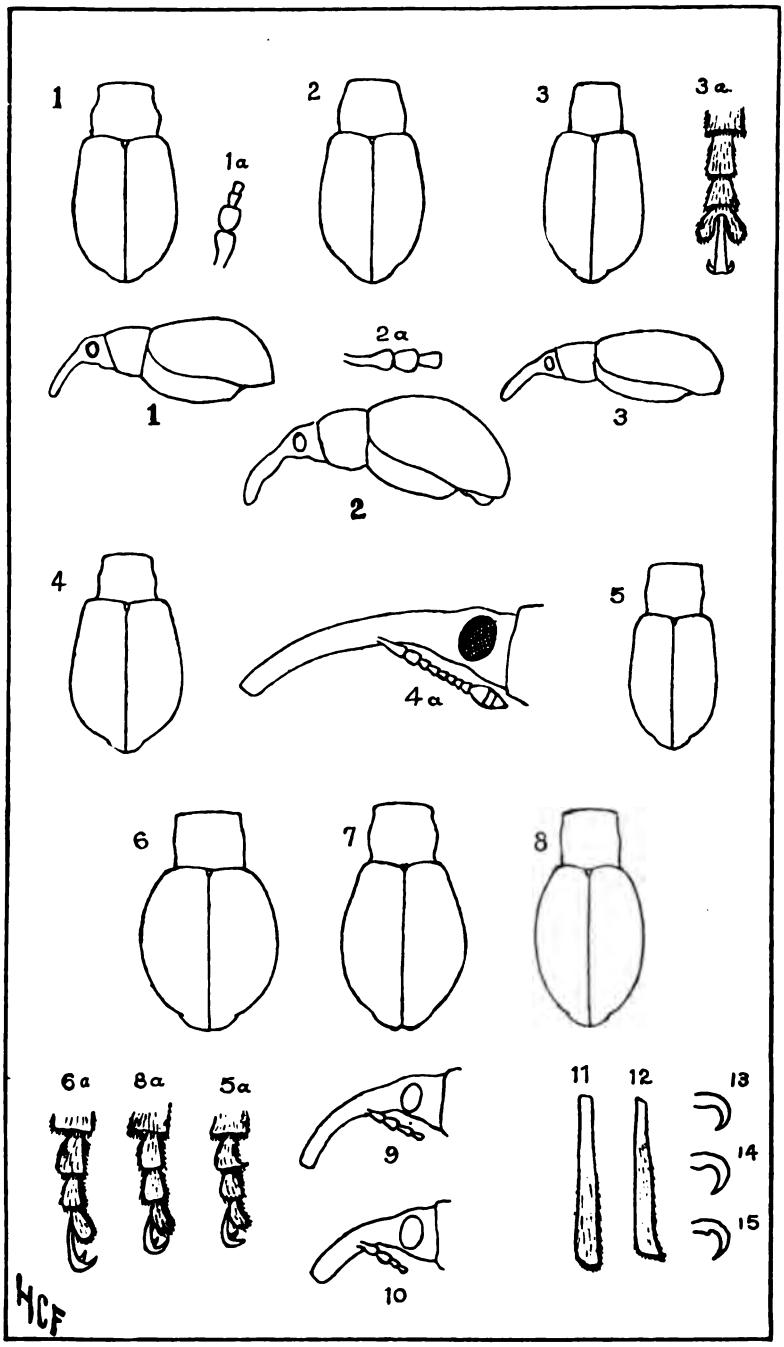
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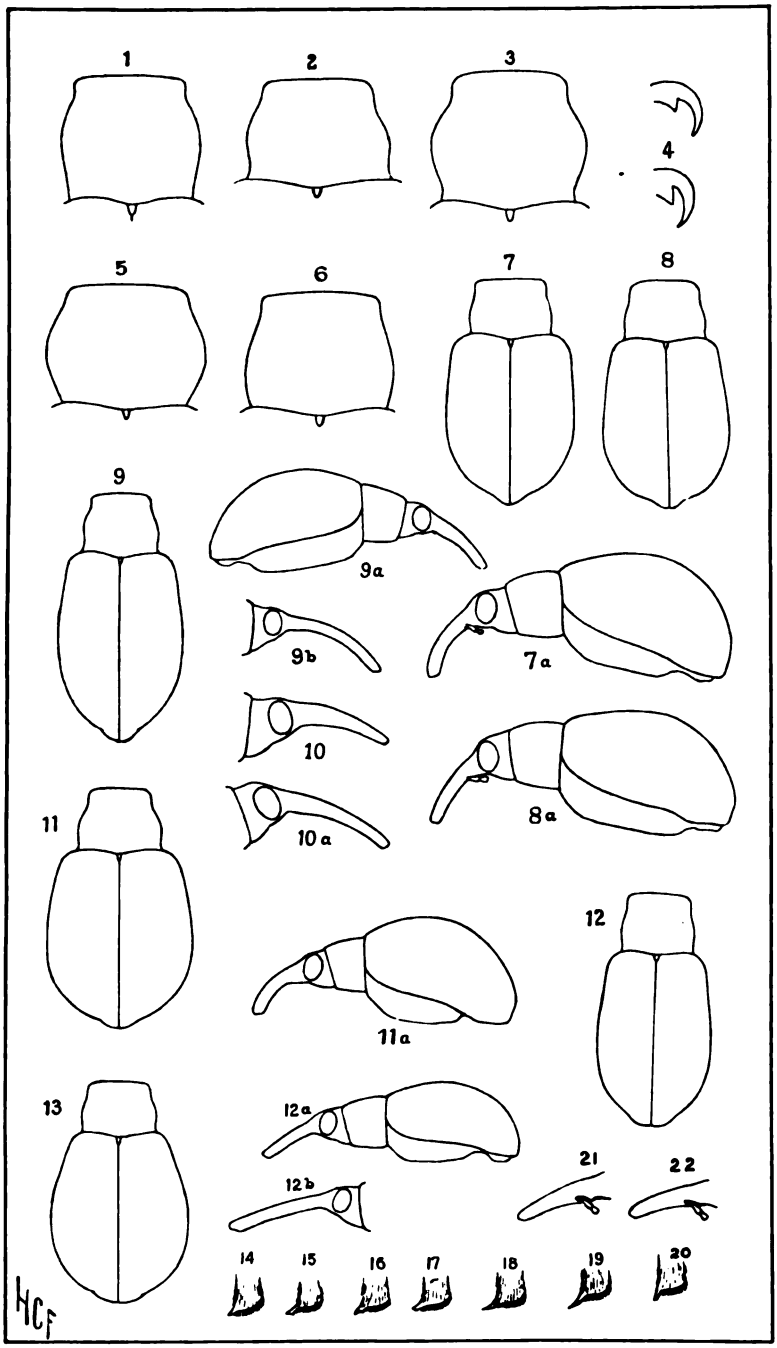
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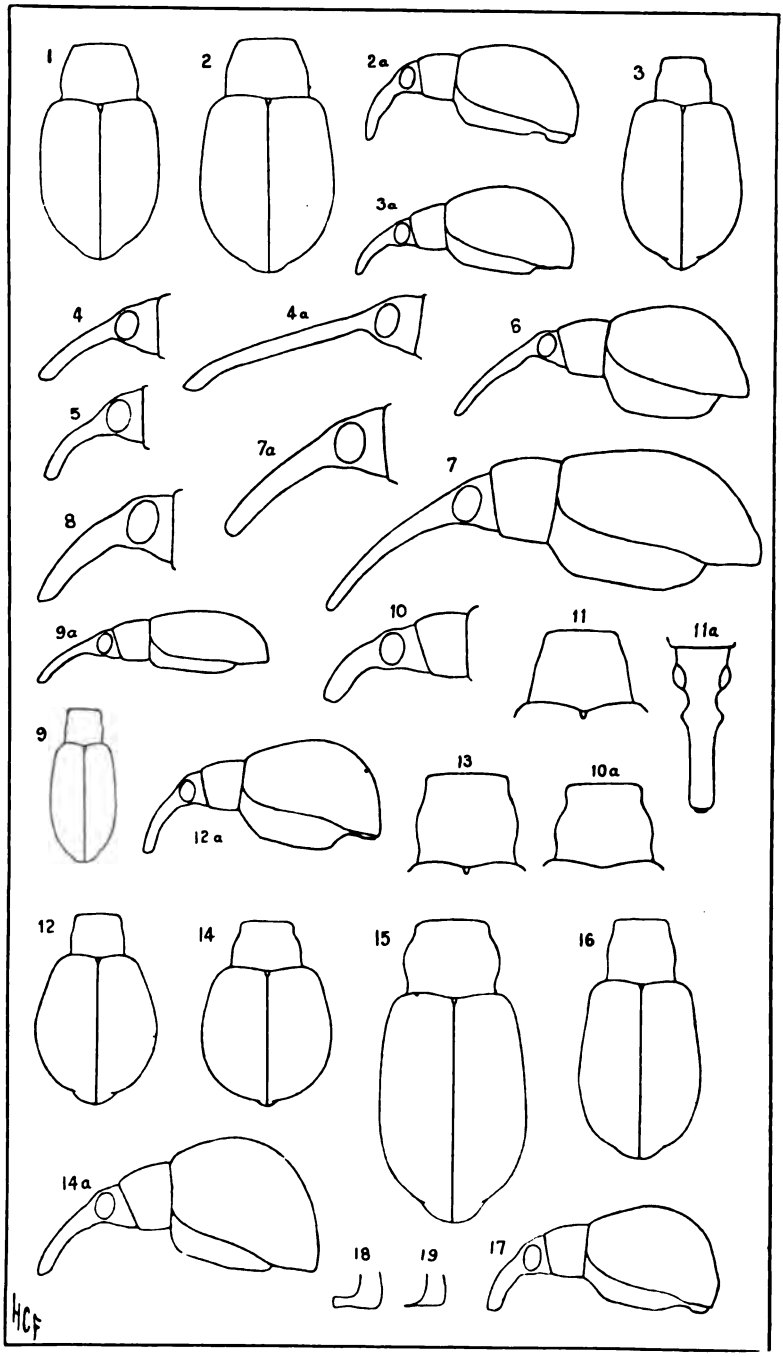
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ON SOME PANURGINE AND OTHER BEES.

BY T. D. A. COCKERELL.

[The types of the new species described herein, excepting *Sphecodes knetzschi*, are in the collection of the American Entomological Society.—W. J. Fox.]

(1.) **Halictus parvus** (Cress.).

Panurgus (?) *parvus* Cr., Proc. Ent. Soc. Phil., iv, 175, ♂, ♀.—Cuba.

Mr. Fox sends me an authentic specimen, a ♂. It is an *Halictus* with two submarginal cells, similar to *H. anomalus* Rob. Length about 4 mm. Tongue quite slender at end; maxillary palpi 6-jointed, joints subequal, but the two last longer than those before, third joint not shorter than second. Venation as in *Hemihalictus*, i. e., with a large stigma, and third discoidal contracted above. Head and thorax green; abdomen and legs dark brown; antennæ dark brown above, pale brown beneath; face narrowed below, with appressed white pubescence; tegulæ testaceous; stigma brown; nervures piceous; front as closely punctured as is possible; mesothorax shining. I do not refer this to *Hemihalictus*, because I am convinced that it is an offshoot from the ordinary green Halicti, and has no genetic connection with the type of *Hemihalictus*, other than through *Halictus* proper.

(2.) **Halictus texanus** (Cr.).

Sphecodes texana Cr., Tr. Am. Ent. Soc., iv, 249, ♀, ♂.—Tex. (not *H. texanus* Cr., t. c., p. 251, which is *H. ligatus* var.).

In the Mesilla Valley, New Mexico, this species is not very rare. Miss J. E. Casad took it at Mesilla on April 13th, at flowers of pear. Prof. E. O. Wooton took both sexes at Las Cruces on October 17th, at flowers of the *Senecio*, which passes for *S. douglasii* in the books, but which, according to Prof. Wooton, is really distinct.

The first recurrent nervure does not unite with the second transverso cubital, though it comes very near it. Our insect is simply an *Halictus* with a red abdomen, and should be separated from *Parasphecodes* on the same grounds that *H. parvus* is excluded from *Hemihalictus*, namely, the absence of blood-relationship except through typical *Halictus*.

Parasphecodes californica Prov., must be called *Halictus californicus* (Prov.).

(3.) **Sphecodes semicoloratus** (Ckll.).

Halictus semicoloratus Ckll., Tr. Am. Ent. Soc., xxiv, 168, ♀.—N. Mexico.

A curious little species, with a narrow abdomen like the very much larger *S. kincaidii.*

(4.) **Sphecodes knetschi** n. sp. ♀.—Length about 7½ mm., *entirely black, except that the tibiæ are dark sepia brown, the tarsi lighter brown,—one might say dull ferruginous, and the shining hind margins of the first three abdominal segments are broadly castaneous.* Antennæ wholly dark, the flagellum with the feeblest brown tint beneath; wings smoky, the nervures and stigma fuscous; tegulæ piceous. Head transversely oval, facial quadrangle much broader than long; labial palpi with the first joint longest, the last three quite short and subequal; mandibles bifid; mesothorax tolerably shiny, with a slight median carina, and very large well-separated punctures; base and sides of metathorax irregularly reticulated with raised lines; abdomen with sparse but quite strong punctures; apex with pale brownish hair; hind spur of hind tibia minutely ciliate.

♂. Similar, except in the ordinary sexual characters. Flagellum only faintly brown beneath. Nervures and stigma piceous. Legs black; the tarsi faintly brownish. (Abdomen lost in the only ♂ before me).

Hab.—Terra Cotta, Illinois (Robert Knetsch). On flowers of goldenrod, the ♂ August 25, the ♀ September 5, 1897.

Differs from *S. smilacinæ* Rob., in the larger size, color of legs and antennæ, and punctures of abdomen.

(5.) **Callandrena** (n. g.) **manifesta** (Fox).

Panurgus manifestus Fox, Pr. Cal. Ac. Sci., Ser. 2, Vol. iv, p. 113, ♀, ♂.—L. California.

Mr. Fox sends me types of both sexes. Superficially the insect resembles *Rhophites*, but the mouth-parts are entirely different. Labial palpi (♂) formed like those of *Andrena pulchella*, but shorter, with the penultimate joint much shorter than the last, whereas in *pulchella* it is very little shorter. The maxillary palpi are also of the type of *pulchella*, but shorter, with the penultimate joint very short. The eyes in both sexes are of a lilac color, perhaps due to soaking in alcohol. Stigma small, as in *pulchella*. Abdomen very like that of *pulchella*. Face-marks of both sexes much as in ♂ *pulchella*, light yellow; clypeus with sparse small punctures in ♀, large and much closer one in ♂. Wings quite dark.

Callandrena is the extreme end of the line which diverges from typical *Andrena* in such forms as *A. pulchella*, and therefore has no particular connection with *Parandrena*, the two submarginals notwithstanding. It is readily known by the yellow face-marks in both sexes, the small stigma, the palpi as described and the venation.

(6). **Andrena chalybea** (Cress.).

Panurgus chalybæus Cr., Tr. Am. Ent. Soc., vii, p. 61.—California.

Mr. Fox sends a typical specimen, and also several from Southern California. The mouth-parts are practically as in *Andrena*. Process of labrum bidentate; basal nervure straight. This is a derivation of the blue Andrenæ, such as *A. cærulea*.

(7.) **Parandrena regularis** (Cress.).

Panurgus regularis Cr., Tr. Am. Ent. Soc., vii, p. 62.—Calfornia.

Mr. Fox sends a typical example. I am not sure this might not form a distinct genus; it differs from typical *Parandrena* by the wholly dark face in the ♂, the dense abdominal hair-bands, the small stigma, the third discoidal cell with its apical angle less than a right angle, the emarginate tip of the abdomen, and the longer and more pointed maxillæ.

(8). **Parandrena nevadensis** (Cress.).

Panurgus nevadensis Cr., Tr. Am. Ent. Soc., vii, 214, ♂.—Nevada.

Very close to *andrenoides* (Cr.), but differs by its smaller size, fulvous pubescence, smaller cheeks, and head not so bulging behind the tops of the eyes.

The ♀ is unknown. It will doubtless be found to have a dark face and red abdomen, like the ♀ of *andrenoides*.

(9.) **Parandrena eumarpha** n. sp. ♂.—Length about 11½ mm

Subg. ch.—Antennæ comparatively short; abdomen with dense hair-bands; stigma small; apical angle of third discoidal cell much less than a right angle.

Sp. ch.—Black, pubescence mostly white, but pale ochraceous on occiput and thoracic dorsum. Head ordinary; face not very broad, wholly dark, densely covered with long white hair, which extends also onto the scapes of the antennæ, but ends abruptly on the front, leaving the shining and punctured surface of the vertex entirely visible. The vertex is thinly clothed with black hairs, not readily noticed, while the occiput has abundant long pale ochraceus hair. Cheeks with white hair, quite long below. Antennæ wholly dark; maxillæ quite long, acutely pointed; maxillary palpi quite elongated; mandibles slightly ferruginous at tips; thorax clothed with long pubescence; mesothorax somewhat shiny, strongly and closely punctured with a strong median groove; scutellum very closely punctured, except the anterior border, which is nearly impunctate; enclosure of metathorax dull, minutely tessellate, not bounded by a rim; tegulæ testaceous; wings dull hyaline; subcostal nervure black, the other nervures and the stigma brown; first recurrent nervure joining second submarginal cell almost at its extreme base; second submarginal narrowed about half to marginal; legs black, thickly clothed with long white hair; claws ferruginous; abdomen rather long, strongly and closely punctured, except on the shining bases of the segments; first segment with long hair, all the segments thinly pubescent; the hind margins of all the segments with dense, narrow, continuous snow-white hair-bands; venter with little hair.

Hab.—Southern California, one sent by Mr. Fox. *P. eumarpha* is a fine species, allied to *P. rhodocerata* (Ckll.), but considerably larger. These insects are at least subgenerically distinct from typical *Parandrena*.

(10.) **Andrena foxii** n. sp. ♀.—Nearly 12 mm. long, *blue-black, the pubescence entirely black or dark fuscous.* Head rather large; facial quadrangle broader than long; antennæ dark, faintly brownish at the tip; face with abundant long black hair; front striate; clypeus dull, with small close punctures, no impunctate median line; tongue broad and short; mandibles dark; *process of labrum strongly bifid;* thorax quite hairy; mesothorax dull, with strong median and parapsidal grooves, its surface microscopically tessellate and feebly punctured; base of metathorax minutely rugulose; tegulæ piceous; wings hyaline, slightly smoky; nervures and stigma piceous; stigma large; *only two submarginal cells,* second submarginal longer than the first on the cubital nervure, receiving the recurrent nervures at the end of its first and beginning of its last fourths; legs black, very hairy; abdomen shining; microscopically tessellate and sparsely punctate; the hind margins of the segments brownish; no hair-bands; apex densely clothed with sooty hair.

♂. About 10½ mm. long, similar to the ♀, but dull white hair on the cheeks, front, occiput and thoracic dorsum; basal joint of hind tarsi with a dense ochreous brush on inner side; wings somewhat clearer.

Hab.—Southern California, three sent by Mr. Fox. A very distinct species, constantly with only two submarginals. I had marked it as a new *Parandrena*, but it is strictly congeneric with *A. chalybea*, and with it forms a subgenus which must have been derived from *Andrena* s. str., independently from *Parandrena*.

(11.) **Andrena phenax** n. sp. ♀.—Length 9½ mm., black, with black pubescence; quite shiny. This looks like a small example of *A. foxii* but differs in many details, as follows:—Color black, without the blue tinge; head broader in proportion to its length; vertex and front with large punctures; clypeus with large and very close punctures; process of labrum rounded at end, not emarginate; mesothorax shining, though microscopically tessellate, with large and strong punctures; tegulæ with a testaceous area behind; wings pale fuliginous; second submarginal cell not so long as the first on the cubital nervure; recurrent nervures entering second submarginal at end of first and beginning of last fifths; pubescence of hind legs short and dense; abdomen very shiny, with very distinct and tolerably close punctures, smaller and sparser on the first segment; surface less hairy; hind margins of segments not brownish.

Hab.—Southern California, one sent by Mr. Fox. Besides having only two submarginal cells, this differs from *A. nigra* Prov., in the total absence of a smooth line down the middle of the clypeus, and the color of the tegulæ. It doubtless differs in other characters, not mentioned in Provancher's short description of *nigra*. It should not be confused with *Halictoides maurus*, which has much smaller punctures on the mesothorax, base of methorax with regular raised lines, and presents many other differences when examined carefully.

(12.) **Parandrena concinnula** n. sp. ♂.—Length 7 mm., black, with thin, long, pale gray or whitish hair. Head transversely oval; facial quadrangle broader than long; clypeus lemon-yellow, with two black spots, *no other yellow on face;* a conspicuous and long fringe of white hair below the margin of the clypeus, overlapping the mandibles; mandibles dark; flagellum, except at base; ferruginous beneath; front and vertex minutely roughened; cheeks not so large as in *P. andrenoides;* mesothorax minutely tessellate, with shallow punctures, much as in *andrenoides;* metathorax like that of *andrenoides;* tegulæ brown; wings hyaline; nervures and the large stigma ferruginous; venation as in *andrenoides*, but the second submarginal cell longer on the cubital nervure; legs and abdomen like those of *andrenoides*, but the abdomen hardly so hairy. Apex of abdomen truncate, and penultimate ventral segment produced into a blunt spine on each side, as in *andrenoides*.

Hab.—Southern California, one sent by Mr. Fox. Close to *andrenoides* and *nevadensis;* easily known by the yellow of the face being confined to the clypeus.

(13.) **Parandrena enocki** n. sp. ♂.—Length about 8 mm., black, with long white hair; face wholly black.

Subg. ch.—Antennæ fairly long; abdomen without hair-bands; stigma large; *second submarginal cell longer than first on cubital nervure;* apical angle of third discoidal cell a right angle; apex of abdomen truncate; *no subapical lateral spines.* The two characters italicised differ from *Parandrena*, s. str.

Sp. ch.—Head transversely oval; mandibles slender, dark, notched within, becoming ferruginous at tips; process of labrum inclined to be bifid; flagellum faintly brownish beneath; face covered with long silky white hair, *except at the extreme sides, where it is black;* cheeks and occiput with white hair, except behind the tops of the eyes, where it is black; front and vertex coarsely rugulose, the vertex with distinct grooves; clypeus roughened, with no median smooth line; thorax small, not so broad as head; *mesothorax dull, minutely roughened, with numerous obscure but large shallow punctures; base of metathorax irregularly reticulated with raised lines:* pubescence of thorax long and thin; tegulæ dark brown, with shallow punctures; wings perfectly clear; nervures and stigma dark brown; second submarginal cell very long, receiving the recurrent nervures at about the end of its first and beginning of its last fifths. Legs slender, brown-black, with pallid hair; abdomen oval, shining; punctures small, feeble and sparse; no hair bands, scattered white hairs becoming dense at the apex.

Hab.—Southern California, one sent by Mr. Fox. I think this is a derivative of *Andrena* independently from *Parandrena*, but it has the general build and appearance of the letter genus. It is named after Mr. Enoch, whose admirable preparations of the mouth-pieces of bees, figured by Mr. E. Saunders, are of constant assistance to the apidologist.

(14.) **Halictoides saundersi** n. sp. ♀.—Length 7 mm., black, with not very abundant pubescence, pale greyish ochreous above, sordid white below. Head seen from in front nearly round, about as broad as thorax; antennæ short and stout, truncate at end; flagellum, except at base, dull ferruginous beneath;

scape with long hair; clypeus with large punctures: front and vertex shining, with strong well-separated punctures; labrum flat and shining; mandibles ferruginous at tips; tongue narrow and extended, but neither the maxillæ nor the palpi very long. the palpi especially are not nearly as long as in *H. marginatus;* mesothorax pubescent, but the surface visible, shining, with strong well-separated punctures; base of metathorax semilunar, with a distinct margin, shining. with many distinct and even raised longitudinal lines; tegulæ dark brown; wings dusky hyaline; nervures and stigma brown; venation as in *marginatus*, with a fairly large stigma and wavy cubital nervure; legs black, with pubescence, which shines silvery in certain lights; abdomen fairly broad, punctured, the punctures much closest at the bases of the segments; no hair-bands, but the first four segments with very broad and conspicuous testaceous hind-margins; apex with a triangular patch of velvet of the brightest apricot color. Venter flat, little hairy.

♂. About the same length, abdomen narrower. Pubescence all white; clypeus with a dense white beard; antennæ short for a ♂; middle of front with an impunctate area, surrounded by very sparse punctures; testaceous margins of abdominal segments not so broad; no apical color at the apex; first ventral segment submarginate; penultimate ventral segment with a ferruginous process, shaped something like the tail of a fish, and to each side of it a piceous process.

Hab.—Southern California, 1 ♀, 2 ♂, sent by Mr. Fox. Differs at once from *H. marginatus* by the smaller size, base of metathorax, color of apex of abdomen, etc. Named after Mr. E. Saunders, who has given excellent descriptions and figures of the structural characters of many genera of bees.

(15.) **Halictoides mulleri** n. sp. ♀.—Length 7½ mm., black, the front and vertex having a strong blue tinge; pubescence scanty, except on hind legs and parts of the abdomen, white, more or less tinged with ochreous; some inconspicuous black or fuscous hairs on scape and vertex; occiput with quite a conspicuous white fringe; sides of face with white hair; head somewhat broader than round, viewed from in front; front and vertex strongly and very closely punctured; clypeus with large punctures, absent just before the anterior margin; mandibles short and stout; tongue long and narrow; palpi not very long; antennæ very short, truncate at tip; flagellum dull ferruginous beneath: mesothorax bare, shining. with very close. strong punctures; area round tegulæ pubescent; metathorax with the enclosure not well defined, presenting rather obscure longitudinal raised lines at the base; tegulæ dark brown; wings smoky hyaline; nervures and stigma dark brown; venation like that of *marginatus*, except that the first recurrent nervure enters the second submarginal cell very near its base; legs black; pubescence on hind tibiæ and tarsi dense; abdomen closely punctured at the bases of the segments; hind margins of the first three segments brownish, of the fourth whitish; bases of second to fourth segments banded with appressed white pubescence; third segment with a subapical white hair-band, thin or interrupted in the middle; fourth with an apical band; apex fulvous, surrounded by dark fuscous hairs; fourth ventral segment with a transverse median depression.

Hab.—Southern California, sent by Mr. Fox. Differs from *marginatus* by the bluish tint of head, banded abdomen, smoky

wings, etc. The name is intended to recall Dr. Hermann Müller, and his admirable researches on the relations between bees and flowers.

(16). **Halictoides maurus** (Cress.).

Panurgus maurus Cr., Tr. Am. Ent. Soc., vii, p. 61. ♀.—Colorado.

I have an authentic specimen sent by Mr. Fox. The species is allied to *H. campanulæ* Ckll., but differs by the color of the pubescence. Apical angle of third discoidal cell a right angle; venter of abdomen with a subapical projection and tuft of hair; head transversely oval, with small eyes; facial quadrangle much broader than long; clypeus densely punctured.

(17.) **Halictoides virgatus** n. sp. ♀.—Length about 9 mm., black. Allied in structure and appearance to *H. mulleri*, but differs in its larger size, the head black, without a blue tinge, head not broader than long; semilunar base of metathorax distinctly defined, with distinct but very fine raised longitudinal lines; abdomen with the hair-bands rather better developed; apex of abdomen surrounded with pale fulvous hair.

♂. Length 10 mm., black, hoary, with white pubescence; some black hair at top of scape, at sides of face below antennæ, on upper part of cheeks, on extreme sides of vertex and on front below ocelli, nowhere very conspicuous; head nearly round, seen from in front; the vertex somewhat elongated; occiput with a conspicuous fringe of hair; scape with long hair; clypeus with a dense white beard; front and vertex, strongly and closely punctured; palpi tolerably elongated; antennæ moderately long, black, submoniliform, first four flagellar joints about equal; thorax tolerably hairy, the hairs sordid white; mesothorax shining, strongly and closely punctured; base of metathorax depressed, with numerous, very fine, raised, longitudinal lines; tegulæ brown; wings dull hyaline; nervures and stigma brown; venation as in *halictulus* (♂ *marginatus*), except that the second submarginal cell is more narrowed above; cubital nervure bent; legs black or dark brown; hind tibiæ swollen, with much silvery white hair; on the inner side of the hind tibiæ near the base is a very long curved tuft of white hair; middle femur produced beneath into a prominent lamina shaped like the keel of a racing yacht; basal joint of middle tarsus with a large semilunar lamina on the inner side; basal joint of hind tarsus long, produced at end into a sharp beak-like process, second and third joints of hind tarsus small, with a long lateral process; abdomen well punctured; hind margins of segments whitish; white hair-bands at margins of segments distinct (sometimes largely abraded); apex with silvery hair; first ventral segment submarginate at tip; fourth ventral segment with a projecting point at each extreme side posteriorly; a subapical tuft of white hair, before which is a longitudinal ochreous band.

Hab.—Southern California, 4 ♀, 3 ♂, sent by Mr. Fox. The ♂ is easily known by the extraordinary legs, as described. In the ♂ of the allied *H. saundersi* the legs are slightly modified in the same direction, the front and middle femora being keeled

beneath, but the edge of the keel uniformily curved, the hind tibiæ somewhat swollen, and the second and third joints of the hind tarsi produced at the side. The middle tibiæ of *saundersi* are simple.

(18.) **Diadasia friesei** n. sp. ♀.—Length 11 mm., black with pale ochraceous pubescence. Head ordinary; facial quadrangle about as broad as long; sides and middle of face, labrum, occiput and cheeks pubescent; clypeus bare and shining with distinct but sparse punctures, some large and some small; front above antennæ densely punctured, the punctures tending to run into grooves; area just before the ocelli and vertex shining and very sparsely and feebly punctured; flagellum ferruginous beneath; mandibles rufescent in middle; maxillary palpi 6-jointed, third and fourth with long hairs, fourth longer than fifth and sixth together; thorax with short, tolerably abundant ochraceous pubescence; mesothorax shining, with small, not very close punctures; scutellum with distinct sparse punctures; base of metathorax minutely granular; tegulæ reddish testaceous; wings dusky hyaline; nervures brown; second submarginal cell rather small, hardly narrowed above, receiving the recurrent nervure a little beyond its middle: third submarginal much larger than first; legs black, with ochreous pubescence, that on hind tibiæ long and conspicuously plumose; long hairs on inner side of basal joint of hind tarsi becoming a sort of purplish brown; abdomen dullish and hardly or not punctured, with short sparse pubescence, *pale on the first segment, mostly fuscous or black on the others;* hind margins of the first to fourth segments with ochreous hair-bands, well defined and conspicuous, except on the first; apex with dense ochreous pubescence, more or less tinged with fulvous.

Hab.—Southern California, two sent by Mr. Fox. Named after Mr. H. Friese, of Innsbruck. *D. friesei* is allied to *D. rinconis*, but the tegulæ are quite differently colored, the second submarginal cell is conspicuously smaller, and the two abdominal bands are narrow, with their upper outline ill defined. It differs from *D. apacha* by the color of the abdominal pubescence; from *D. toluca* in the mesothorax and the shape of the second submarginal cell; from *D. albovestita* by the pubescence, and from *D. tricincta* by the abdominal pubescence, especially the absence of black hair on the sixth segment.

(19.) **Diadasia megamorpha** n. sp. ♂. Length about 16 mm.: black, with dull white pupescence not hiding the surface. Head somewhat broader than long; facial quadrangle longer than broad; ocelli in a line; face to some distance above the antennæ; labrum, lower and hind part of cheeks with abundant pubescence; vertex and upper part of cheeks bare, shining, with some scattered punctures,—even these wanting on sides of vertex; clypeus punctured; mandibles black, with two orange stripes near the tip; maxillary palpi 6-jointed, fourth longer than fifth and sixth together; antennæ black, reaching to hind part of tegulæ; thorax with abundant erect white pubescence, except the mesothorax, which is bare, shining, with numerous shallow but distinct punctures and a very few scattered hairs; at the place of each parapsidal groove is a

short ridge; base of metathorax smooth and shining, with a median furrow; tegulæ large, reddish brown; wings hyaline; nervures dark brown; second submarginal cell narrowed about one-third above, *first recurrent nervure joining second transverso-cubital*, second joining third submarginal cell almost at its tip; legs well developed, black, the tarsi becoming brownish; pubescence of legs all white, except on inner side of basal joints of tarsi, where it become orange-brown; spurs large, ferruginous; hind tibiæ swollen; abdomen rather elongate, shining, with small sparse punctures; hind margins of segments narrowly brownish; the whole surface with rather long, erect, yellowish white hair, only dense enough to conceal to surface towards and at the apex; no well-defined bands; apex strongly bidentate.

♀. Length about 15 mm., but much broader, and thus more bulky than the ♂. The pubescence is shorter and denser, with more of an ochreous tint, and covers the front and sides of the mesothorax, leaving, however, a shining and sparsely punctured middle area. The wings are slightly brownish, and the first recurrent nervure joins the second submarginal cell just before its end, while the second recurrent meets the third transverso-cubital. Antennæ entirely black, hardly reaching to tegulæ; hind portion of scutellum and postscutellum dullish, with close punctures; abdomen hairy, the pubescence appressed; hind margins of segments 2 to 4 with narrow white hair-bands; apex becoming fulvous; the pubescence of the abdomen, and especially of the legs, is cream color rather than white; brush on inner side of basal joints of tarsi dark, chocolate, with a slight coppery tint. Claw and the large claw-joint entirely black; tegulæ piceous, with a pale brown margin.

Hab.—The ♂ was taken on the campus of the New Mexico Agricultural College, Mesilla Valley, in September (Ckll. 2408). It was compared by Mr. Fox with Cresson's types and returned marked "near *densa*." The ♀ was taken at flowers of *Sphæralcea angustifolia* at Whitewater, by the White Sands, New Mexico, October 6th (Ckll. C 32.). I think it is safe to assume that the sexes described are of one species, which may be known by its large size. Of the New Mexico species *D. megamorpha* is most like *D. australis* Cr., which I took at Santa Fé, June 20th, at flowers of *Opontia*. The ♂ of *australis* will readily be known from our insect by the structure of the hind tarsi, the more pubescent abdomen and the pubescent mesothorax. I find I have also a ♂ of *D. australis*, which I took on July 9th at Whitewater, in Grant Co., New Mexico, a locality far distant from the "Whitewater" cited above for the ♀ of *megamorpha*. In the Mesilla Valley the common *Diadasia* is *D. diminuta:* it visits especially the flowers of *Sphæralcea angustifolia*, but also garden roses. Another species, *D. enavata* Cr (*ursina*), is common in New Mexico, and may be taken in the Mesilla Valley, in September, at flowers of *Bigelovia wrightii* and *Verbesina encelioides*, at Santa Fé, in August, at flowers of *Argemone*, and has also

occurred at Rincorn, New Mexico, July 5th, at flowers of *Chilopsis* (Ckll. B 4): at Lone Mountain, nearly Silver City, July 6th, in closed flower of *Argemone;* Lone Mountain, July 7th, at flowers of *Sidalcea malvæflora;* Deming, July 9th, at flowers of *Verbesina encelioides*, and at Colora'o, New Mexico, July 10th, at flowers of *Sphæralcea angustifolia.*

(20.) **Calliopsis subalpinus** Ckll., 1894.—One from Arizona, sent by Mr. Fox.

(21.) **Calliopsis semirufus** Ckll., 1896.—Two from Arizona, sent by Mr. Fox.

These bees are hardly true *Calliopsis;* in several respects they more resemble *Panurgus.*

I think *C. semirufus* is the ♀ of *subalpinus*, notwithstanding the difference of color. If so, the case is a most interesting one, since the ♀ has the red abdomen, the ♂ being all black—exactly the reverse of what occurs in certain species of *Perdita.*

(22.) **Calliopsis obcurellus** Cress.

One from Southern California, sent by Mr. Fox; several from Pasco, Washington, May 25th (T. Kincaid). Thus the species appears to occupy the whole Pacific Coast of the United States.

(23.) **Panurginus innuptus** (Ckll.).
Calliopsis innuptus Ckll., Ent. News, 1896, p. 222.—Colorado.

The type was a ♂. I have the ♀ from Colorado Springs, Colo., and also from Nowlin County, South Dakota, one lent by Mr. Fox. The ♀ resembles the ♂, but the face is all dark; it is very much like *C. perlævis*, but is known from it by the ferruginous hind tarsi, the dark flagellum and the quite pellucid wings.

(24.) **Panurginus atriceps** (Cr.).
Calliopsis atriceps Cress., Tr. Am. Ent. Soc., vii, p. 67, ♂.—California.

Mr. T. Kincaid has taken both sexes in numbers at Seattle, Washington, during the first half of May; also at Olmypia, May 28th to June 2nd. One ♂, Seattle, May 14th, was at flowers of *Rubus ursinus.* The ♀ resembles the ♂, but is more robust, with shorter antennæ and a broader abdomen. It is a smooth insect with a dark flagellum like *asteris, rudbeckiæ, albitarsis, ornatipes* and *bidentis.* The tegulæ are black or piceous, conspicuously darker than in any of the above five species. The first recurrent nervure meets the transverso-cubital as in *clypeatus*, but the ♀ *clypeatus* has the flagellum ferruginous beneath.

Mr. Fox sends a ♂, *P. atriceps*, marked Craig's Mt., Idaho. This is interesting, because it adds one to the several known instances of Pacific Coast forms invading that region.

Calliopsis and *Panurginus*.

The following table is intended to facilitate the identification of species of *Calliopsis* in the broad Cressonian sense, exclusive of the females of *Panurginus*, which are so much alike that I cannot construct a table until I have all of the species before me:

Abdomen fulvous or rufous ..... 2.
Abdomen dark, with or without markings ..... 3.
2. Wings hyaline, a dark spot at apex ..... **semirufus** Ckll.
Wings uniformily pale fuscous ..... **abdominalis** Cr., ♂, ♀.
3. Face with light markings ..... 4.
Face without light markings ..... 43.
4. Abdomen with color-bands or spots ..... 5.
Abdomen without bands or spots ..... 14.
5. First segment of abdomen red marked with black, face-marks yellow, dog-ear marks present ..... **tricolor** Ckll.
Not so ..... 6.
6. Clypeus dark, but white lateral spots ..... **obscurellus** Cr., ♀.
Clypeus only partly light, females ..... 7.
Clypeus all light, except the dots and edge, males ..... 10.
7. Pale marks yellow or yellowish, continuous yellow bands on abdomen. **zebratus** Cr.
Pale marks white or whitish ..... 8.
8. Supraclypeal mark present, smaller ..... 8a.
8a. Lateral face-marks broader, clypeus with a median white stripe. **australior** Ckll.
Lateral face-marks narrow, clypeus without a median stripe. **scitulus** Cr.
8b. Supraclypeal mark absent, larger ..... 9.
9. Abdomen with two interrupted bands ..... **edwardsii** Cr.
Abdomen with only spots ..... **edwardsii** v. **lateralis** Cr.
10. Supraclypeal mark present ..... 11.
Supraclypeal mark absent, clypeus white ..... 13.
11. Clypeus, etc., yellow, tubercles yellow ..... **zonalis** Cr., ♂.
Clypeus, etc., white or yellowish white ..... 12.
12. Larger, California species ..... **edwardsii** Cr., ♂.
Smaller, Colorado species, posterior tarsi with basal joint long, flat, dilated, truncate at tip ..... **pictipes** Cr., ♂.
13. "Lower sides of face" white; "spot at extreme base and apex of intermediate tibiæ yellowish." ..... **cinctus** Cr., ♂.
"Sides of face" white; 4 anterior tibiæ and tarsi more or less yellowish in front ..... **obscurellus** Cr., ♂.
14. Females ..... 15.
Males ..... 17.

15. Clypeus with a longitudinal mark or band on disc.....16.
Clypeus yellow, except two cuneiform black marks, lateral face-marks going nearly to summit of eyes .....**coloradensis** Cr., ♀.
Sides of clypeus yellow, small dog-ear marks, margins of abdominal segments testaceous.....**maculatus** Sm., ♀.
Face with only a kidney-shaped yellow mark, partly (sometimes not at all), on clypeus; legs all dark; marginal cell squarely truncate.
Panurginus renimaculatus (Ckll.), ♀.

16. Clypeal mark white. Georgia species.....**lapidus** Cr., ♀.
Clypeal mark yellow, lateral and supraclypeal marks present
andreniformis Sm., ♀, and sulsp. **rhodophilus** Ckll., ♀.

17. Black spot at tip of wing, face very broad, supraclypeal and dog-ear marks present, lateral marks very small.....**subalpinus** Ckll.
Legs entirely, and all face below antennæ, bright yellow.
flavipes-andreniformis Sm., ♂.
Not so, legs not all yellow.....18.

18. Pale color of face confined to clypeus .....19.
Pale color of face not confined to clypeus.....22.

19. Clypeus not at all light, sometimes only a spot of yellow. California species.....**Panurginus californicus** (Cr.), ♂.
Clypeus all light.....20.

20. First recurrent nervure meeting the transverso-cubital; clypeus white.
Panurginus clypeatus (Cr.), ♂.
First recurrent nervue not meeting the transverso-cubital.....21.

21. Larger, marginal cell longer.....**Panurginus townsendi** (Ckll.).
Smaller, marginal cell shorter.....**Panurginus bakeri** (Ckll.).

22. Pale color confined to clypeus and lateral marks.....23.
Pale color not confined to clypeus and lateral marks.....32.

23. Wings wholly dark fuliginous.....**fraterculus** Ckll.
Wings not nearly so dark.....24.

24. Face-marks white .....25.
Face-marks yellow.....26.

25. Face hairy.....**hirsutifrons** Ckll.
Face not hairy.....**Panurginus pauper** (Cr.).
(Similar, but face-marks very pale yellow, lateral marks obtuse, face not nearly so hairy as in *hirsutifrons*.....**albitarsis** Cr.).

26. Tubercles dark .....27.
Tubercles light .....30.

27. Basal joints of tarsi all yellow.....28.
Basal joints of anterior and middle tarsi testaceous.
Panurginus parvus (Rob.).
Tarsi brownish testaceous.....29.

28. Length 7 mm.....**Panurginus rugosus** (Rob.).
Length 5 to 6 mm.....**Panurginus asteris** (Rob.), var.
Tibiæ and tarsi bright yellow .....**C. coloradensis** Cr., ♂.

29. Larger, face-marks deep yellow, stigma dark ferruginous brown.
Panurginus innuptus Ckll.
Smaller, face-marks very pale yellowish, stigma dark fuscous.
Panurginus albitarsis (Cr.).
Face-marks lemon-yellow, tegulæ brown (very pale and hyaline in *innuptus*), wings faintly dusky at apex (not at all in *innuptus*).
picipes Cr.

30. Head and thorax quite thickly pubescent, all the tarsi pale yellow. Illinois species..... **illinoensis** Cr.
Head and thorax sparsely pubescent .....31.
31. Lateral face-marks very narrow above..**Panurginus bidentis** (Ckll.).
Lateral face-marks not very narrow above.
Panurginus rudbeckiæ (Rob.), if there is a var. without supraclypeal mark.
Lateral face-mark only "a spot".....**Panurginus asteris** (Rob.).
Obs. *P. rudbeckiæ* also differs from *asteris* by the median impunctate depression of clypeus. Perhaps a form of *coloradensis* comes here; it will have tibiæ and tarsi bright yellow.
32. Supraclypeal marks, but no dog-ear marks.....33.
Dog-ear marks present, or face even all yellow.....39.
33. Tibiæ and tarsi all yellow.....**citipes** Ashm
Tibiæ, at least, mostly dark.....34.
34. Four hind tibiæ yellow at base and apex .....35.
Four hind tibiæ not yellow at base and apex.....36.
35. Lateral face-marks prolonged above level of supraclypeal mark.
concinnus Fox.
Lateral face-mark "a spot".....**P. asteris** (Rob.).
(In *rudbeckiæ* the lateral face-marks are longer than in *asteris*, and there is an impunctate area on clypeus; the flagellum is pale testaceous beneath in *concinnus*, dark in *rudbeckiæ*).
36. Clypeus, etc., white, antennæ wholly black.....**atricornis** Cr.
Clypeus, etc., yellow ..... .37.
37. Clypeus with a median impunctate space.....**P. rudbeckiæ** (Rob.).
Clypeus without such space.....**Panurginus labrosus** (Rob.).
38. Wings dark fuliginous, face lemon-yellow, not quite up to antennæ.
æthiops Cr.
Wings not dark fuliginous.....40.
39. Scape wholly black .....41.
Scape yellow in front .....42.
40. Less densely punctured, marginal cell longer.
Panurginus (*ornatipes* var, ?) **boylei** (Ckll.).
More densely punctured, marginal cell shorter.
Panurginus compositarum (Rob.).
41. First four tibiæ yellow in front.....42*a*.
Tibiæ yellow with a black spot on each side.
Panurginus ornatipes (Cr.).
41*a*. All the tibiæ yellow in front.....**C. rhodophilus** Ckll.
First four tibiæ yellow in front.....**C. flavifrons** Sm.
42. Abdomen with light color bands.....44.
Abdomen without such bands.....45.
43. Abdominal bands white, anal fimbria dirty white .....**meliloti** Ckll., ♀.
Abdominal bands yellow, anal fimbria fuscous.....**cinctus** Cr., ♀.
Abdominal bands and anal fimbria white, *scitulus*-like species, much larger than *meliloti*.....**personatus** Ckll., ♀.
44. Males.....46.
Females.....47.

45. Larger, abdominal segments depressed at base. Mexican.
Pasiphaë mexicanus (Cr.).
Smaller, shining. Californian.....**Pasiphaë atriceps** (Cr.).
46. Wings dark fuliginous.....48.
Wings not dark fuliginous.....**Pasiphaë** spp.
47. Larger, no shining boss at top of eyes.....**æthiops** Cr.
Smaller, a shining boss at top of eyes.....**fraterculus** Ckll.

It must be admitted that in several of its parts the above table is unsatisfactory, but I have had it in use for some time and found it serviceable. The student must remember that these tables are intended to suggest identities rather than proove them, and the detailed descriptions should always be consulted. This is especially to be insisted on in a fauna like our own, containing so many still undescribed species.

25.) **Heriades semirubra** n. sp. ♂.—Length about 8 mm., black, the first three abdominal segments and the extreme sides of the fourth ferruginous. Pubescence white, mostly with a greyish tinge, very abundant on face, hiding the surface; head round seen from in front; facial quadrangle much longer than broad, the orbits parallel; ocelli in a triangle; cheeks with long dense hair beneath; mandibles hairy at base; apical half dark ferruginous; vertex very closely punctured; antennæ ordinary; flagellum dark ferruginous beneath; thorax strongly and closely punctured; punctures of scutellum somewhat larger than those mesothorax; base of metathorax smooth and shining; tegulæ shining, amber color; wings clear; nervures and stigma piceous; stigma very small, first recurrent nervure reaching second submarginal cell at a point distant from the origin of the first transverso-cubital not more than half the length of the latter; legs black, the tarsi becoming a little brownish at end; abdomen well punctured; hind margins of segments pelucid whitish, third segment with a suffused dorsal black patch; lateral hind margins of the segments with white hair, towards the apex there are more or less continuous, but thin and inconspicuous, bands; apex broadly truncate, with a rounded central emargination, this truncate portion is ferruginous; penultimate segment with a small tooth on each extreme side; ventral segments with white apical hair-bands; no subbasal ventral tooth or process.

Hab.—Southern California, two sent by Mr. Fox. This is by no means a typical *Heriades*, yet it is not an *Ashmeadiella*. The resemblance between *H. semirubra* and *Ashmeadiella holtii* Ckll., ined., is remarkably close, but the latter is smaller, has the end of the abdomen and the hind legs wholly red, besides presenting the characteristic abdominal structure of its genus. The mouth-parts are retracted in the specimens of *H. semirubra* described.

DESCRIPTIONS OF NEW NORTH AMERICAN NEUROPTEROID INSECTS.

BY NATHAN BANKS.

In the following pages I have brought together descriptions of various new species which have come to my notice, together with some synoptic work on certain genera and one family. The final determination of species must rest on sexual characters, but these ought not to be used until the forms have been thoroughly studied in all o her parts for the detection of other characters. So I have not as yet studied and figured the genitalia, but will leave such work for a future revision of the various families, which I hope abundant material may soon justify.

PERLIDÆ.

Chloroperla coloradensis n. sp.—Head yellowish, eyes connected by a black line and a black W mark in front, side spots black; antennæ blackish base yellow, basal joint blackish above; thorax yellowish, margin (except median portion in front) black, the elevated ridges on sides also black, thorax once and one-half broader than long, front margin but little convex; sides much rounded, and hind angles rounded; legs yellowish, tarsi and a mark on knees brown; abdomen dark brown or black, setæ yellowish brown; wings gray hyaline, veins mostly brown, radial sector forked but once, its pedicel about one-half the length of the fork, lower branch of cubital fork simple, five transversals in cubital area. Expanse 20 mm.

Colorado (C. F. Baker).

Chloroperla montana n. sp.—Head rather greenish yellow, quite broad in front, ocelli connected by a black V-shaped mark; basal part of antennæ yellowish, rest fuscous, basal joint above brown; thorax yellow, brownish each side, once and one-half broader than long, sides straight, and front margin nearly straight; legs yellowish, tarsi brownish and a brown mark on knees; abdomen rather brownish, darker above than below; setæ brownish, paler on the bases; wings hyaline, veins mostly brown, costal ones yellow, radial sector forked once, its pedicel being two-thirds the length of fork, lower branch of cubital fork is forked again at anastomosis or near it, six transversals in cubital area, hind wings with radical sector forked once. Expanse 18 mm.

Mt. Washington and Franconia, N. H. (Mrs. Slosson).

Chloroperla virginica n. sp.—Head pale yellow, hind ocelli connected by a transverse black band, from the middle of which arises a narrower black stripe reaching to the front ocellus, the whole forming a T mark; basal part of antennæ pale yellowish, rest brownish, basal joint scarcely infuscate above;

palpi brown; thorax pale brownish, paler on middle, once and a fourth broader than long, sides nearly straight, surface much rugulose; legs yellowish, tarsi darker; abdomen pale yellowish (without darker median stripe), setæ pale: wings gray hyaline, veins mostly yellowish, basal transvereals and cubitals rather brownish, radial sector forks at anastomosis, and the upper branch forks again, its pedicel being two-thirds the length of the fork, six transversals in cubital area, lower branch of cubital fork simple, hind wing has radial sector twice forked as in fore wing. Expanse 22 mm.

Harper's Ferry, Virginia, August.

The species of *Chloroperla* known to me may be separated as below. I have been unable to identify a number of the species of older authors, and they are omitted from the table.

1. Head without dark marks, except the ocelli and lines connecting them.....4.
   Head with some other dark marks.....2.
2. Ocelli are on a solid black triangle and a black spot on front margin of head, a median black stripe on prothorax.....**signata.**
   Head marks different, no median black stripe on prothorax.....3.
3. Larger, the side spots on head transverse, middle of head infuscate. **borealis.**
   Smaller, the side spots nearly round, middle of head not infuscate. **coloradensis.**
4. The two upper ocelli connected to each other by a black line, from which arises a line to the front ocellus, the whole a T mark....**virginica.**
   No such T mark.....5.
5. Hind ocelli connected to front ocellus by a V mark.....6.
   Hind ocelli not connected to front ocellus.....7.
6. Veins mostly pale yellowish.....**bilineata.**
   Veins mostly dark brownish.....**montana.**
7. Thorax more or less margined with brown or black, wings yellowish.....8.
   Thorax not margined, wings greenish.....**imbecilla.**
8. Thorax faintly (but plainly) margined with brown, sides small.....**brevis.**
   Thorax plainly margined by jet black, size larger.....9.
9. Thorax broader, sides more straight, and front margin nearly straight, dorsum of abdomen with black stripe.....**pacifica.**
   Thorax much more rounded on sides and in front, abdomen with black stripe above.....**marginata.**

Nemoura depressa n. sp.—Head and thorax reddish brown, abdomen brighter reddish, antennæ black; prothorax marked somewhat with black, especially on the sides; legs uniform, dull yellowish; wings faintly tinged with yellowish, costal veins and the X black, other veins paler, pterostigma clouded. Head scarcely broader than prothorax; antennæ reaching to middle of wings; prothorax slightly broader than long, sides straight, about parallel, angles square, surface faintly rugulose; subcosta of fore wings nearly touches costa before running into the radius, radial sector geniculate at base, cubital sector arising from cubitus, slightly bent down at tip. Length 9 mm.

Cottage Grove and Divide, Oreg., September (Morse).

Easily recognized by reddish color and rather more depressed form than is common in the genus.

Little has been done to elucidate the sternal characters of the Perlidæ; yet I think that a close study of them will serve to better define the characters of the genera in this family. There are two groups of genera according to the position of the anterior coxæ one group where these coxæ are approximate and directed more downwards; the other group where the coxæ are widely separated and directed more laterally. To the former group belong *Pteronarcys*, *Leuctra*, *Nemoura*, *Tæniopteryx* and *Arsapnia*. To the latter group are the genera *Perla*, *Chloroperla*, *Dictyopteryx*, *Acroneuria* and *Isopteryx*. *Capnia* has the fore coxæ separated, but not as far as in *Perla*, but the hind coxæ are widely separated.

Pteronarcys has the hind coxæ well separated, and between them is a transverse depression with a hole at each end; between the middle coxæ is a triangular depression.

Perla has no such depressions, but there are slits near the coxæ; the hind coxæ are widely separate. I am inclined to think this large genus can be divided on sternal characters into two or more genera.

In *Leuctra*, *Nemoura* and *Tæniopteryx* the hind coxæ are much closer than in other genera; I think these will form a tribe. In *Chloroperla* and *Isopteryx* the hind coxæ are well separated.

CHRYSOPIDÆ.

Meleoma mexicana n. sp.—Head pale greenish, a black dot each side of mouth and a black line under the eyes; palpi lineate with black; antennæ pale yellowish throughout; thorax green, a broad median yellowish stripe, a black dot at each anterior angle of prothorax; legs pale yellowish; abdomen greenish, brownish towards tip; wings hyaline, veins pale green, many of the transversals, especially on basal part of wing, marked with black in the middle, pterostigma scarcely visible. A horn between antennæ of ♂, longer than broad, broader at the tip than in the middle, tip broadly emarginate, each corner pointed, the median part bent at right angle and extending to surface of head, basal joint of antennæ concave on inner margin, second and third joints not curved as in *M. slossonæ*; wings rather long, scarcely pointed at the tip, venation similar to that of other species. Length 20 mm.

One ♂ from Amecameca, Mexico, June (Barrett).

Differs from *M. signoretti* Fitch, in pale antennæ and smaller horn, etc.; from *M. slossonæ* Bks., in pale dorsal stripe, simple antennæ, etc.

Chrysopa erythrocephala n. sp.—Pale yellowish; head reddish, a black dot each side near base of labrum; abdomen blackish, legs and antennæ pale; wings greenish, veins mostly greenish, brownish on middle of costal cross-veins, on the gradate veinlets, and on some veinlets toward base of wing, ptero-

stigma scarcely distinct. Basal joints of antennæ close together, a transverse depression on middle of vertex; prothorax short and broad, a transverse furrow beyond the middle; fore wings moderately broad, scarcely pointed at tip, hind pair narrower and more acute at tip: the third cubital cell plainly wider at tip than base, no longer than second, its divisory veinlet ending about half-way to tip, but beyond the connecting veinlet to the radius, six cross-veins in the series beyond third cubital cell. Expanse 34 mm.

One specimen, San Bernardino, California, July (Morse).

Chrysopa assimilis n. sp.—Green; head reddish yellow, a red-brown or black crescent under each antennæ and a spot between their bases, from the crescent there extends a little line to the black stripe on the cheek, above are two dots above base of antennæ, and two dots on vertex, forming a square with the others (but no dots behind the eyes as in *C. oculata*); antennæ pale, a black ring on second joint and a red mark above on basal joint; prothorax green, with a black spot on the anterior side-margin; thorax and abdomen green; legs pale greenish; wings greenish, veins green, the costals black at each end, the gradate veinlets mostly black, a few postcubital cross-veins at base black, and many of the other cross-veinlets black at one or both ends, pterostigma green. Basal joints of antennæ close together, vertex smooth, shining, prothorax narrowed in front: wings short and broad, fore pair rounded at tip, hind pair slightly acute, third cubital cell scarcely as long as second, broader at tip than base, the divisory veinlet ending beyond the middle and beyond the veinlet connecting to the radius, four or five cross-veins in series beyond the third cubital cell. Expanse 27 mm.

Ashland, Oregon, September; Hood River, Oregon, September (Morse).

CONIOPTERYGIDÆ.

Coniopteryx barretti n. sp. - Head pale yellowish; antennæ brownish: thorax brownish, with a pale yellow median triangular spot, pleura with a few pale spots; legs brownish yellow; abdomen yellowish, with dark spots each side; wings rather dusky, veins black; antennæ fully one-half the length of wings, pubescent; venation as in *C. vicina*, but rather stronger and the veins more prominent, seven or eight cross-veins in the fore wings, the cross-veins connecting second radial sector to radius, and former to first radial sector opposite to each other, the fork of second sector but slightly indenting; hind tibiæ curved. Length 4 mm.

Amecameca, Mexico, June (Barrett).

Differs from *C. vicina* in slightly larger size, paler head, spots on the mesothorax, etc.

MYRMELEONIDÆ.

The characters previously relied upon for the separation of the genera *Brachynemurus* and *Myrmeleon* are not constant and of little importance. The genera are, however, well known by a certain habitus. I have discovered that there is a good generic character in the origin

of the radial sector of the fore wings. In the genus *Brachynemurus* the sector arises much nearer to the base, and there are but three (rarely four) cross-veins between it and the base of the wing; in *Myrmeleon* there are six (or more) cross veins between it and base of wing. The hind tibiæ of *Myrmeleon* (our species) are lineate with black.

Brachynemurus ferox Walk.—Head pale yellowish, a large transverse dark spot at base of antennæ, a transverse spot on vertex giving off an extension each side behind, antennæ dark brown, in ♂ rather longer than the thorax, in ♀ about as long; palpi short, last joint dark; prothorax pale, with four dark stripes, each side-pair united in front and behind, leaving only a narrow median line between them, lower side with a stripe extending on mesothorax; anterior lobe of mesothorax mostly dark, a pale median line, side lobes with irregular dark spot, median lobe with a stripe each side; metathorax mostly dark, a pale spot on each side lobe; pleura mostly dark, and a dark spot on the coxæ; legs pale, femora usually infuscated above and some black on tarsi; abdomen with three dark stripes above run together at apex; venter dark, with pale at base of third and fourth segments in the ♂; wings moderately broad, acute at tip, venation mostly dark, but little marked with pale; median vein broadly marked with dark to beyond middle of wing; a large spot at base of pale pterostigma, the three cross-veins basad of radial sector mostly dark, one or two of the cells often crossed Male appendages cylindrical, moderately short, slightly divaricate and clothed with black bristly hairs. Length ♂, 50 mm.: ♀, 34 mm. Expanse 70 mm.

San Bernardino, California (A. P. Morse).

Brachynemurus 4-punctatus Currie.—Pale yellowish, a black spot between antennæ, usually divided, vertex with a transverse row of four black dots; antennæ light brownish below, darker above, a little shorter than thorax; palpi short, pale, last joint with a brown spot. Prothorax with four black lines, the outer one often broken into spots, the middle pair not extending on posterior lobe, a brown line on each lower side and extending back on the mesothorax; latter pale, with two short stripes above, and a large spot (containing a pale spot) on lateral lobe; metathorax with a median X mark and a stripe each side; coxæ with a dark spot, rest of legs wholly pale; abdomen with three dark stripes running together at tip; venter dark, base and tip of segments pale. Wings moderately broad, acute at tip, main veins marked with fuscous and white, most of venation dark, the median vein broadly colored; pterostigma white, a dark spot beyond; three cross-veins basad of the radial fork mostly or wholly pale, none crossed. Male appendages short, stout, yellow, divaricate, thickly clothed with long black hairs. Length ♂, 36 mm.; ♀ 30 mm. Expanse 54 mm.

Lancaster, California (A. P. Morse).

This species has much resemblance to *B. peregrinus*, but differs in narrower wings, wholly pale legs no transverse lines on vertex, etc.

Brachynemurus minusculus n. sp.—Similar in most respects to *B. 4-punctatus*, but smaller, the antennal spot larger and extends to the eyes each side, rarely divided, a transverse line on vertex, as well as the row of spots; antennæ

darker, apex rather pale; last joint of palpi black; the median stripes on the mesothorax run together; coxæ I with two black spots on outside; femora with a dark line above, and some black on tarsi; abdominal stripes run together at base as well as at the tip; venation of wings more maculose, the three cross-veins basad of radial sector are mostly dark, and the dark on median vein is mostly grouped in elongate spots; many small V marks on veinlets near tip of wing. Male appendages pale, short, more divaricate than in *B. sabulosus*. Length ♂, 28 mm.; ♀, 21 mm. Expanse 40 mm.

Lancaster, California (A. P. Morse).

Brachynemurus centralis n. sp.—Face pale yellowish, a brown spot enclosing antennæ, two dark transverse lines on vertex, the hind one often interrupted in the middle, and a median dot behind; tips of palpi dark, antennæ pale brown; prothorax with two broad submedian dark stripes, leaving a narrow yellowish line, which in the males has a projection in the middle, each stripe has in its front part a distinct pale dot, sides with a shorter dark stripe, and the side margin brown, rest of thorax mostly dark, with scattered pale dots, spots and lines; legs pale, dotted with brown, often quite densely; abdomen dark, in the ♂ with an interrupted pale stripe on each side of the basal segments, last three segments with a transverse pale spot in middle of each, and sometimes a dot at tip; wings hyaline, veins mostly dark, interrupted with pale, some large clouds along the median, at base of pterostigma and forming an oblique line (sometimes indistinct) at end of anal and at end of median vein; hind wings with veins mostly dark, subcosta and radius interrupted with pale. Spurs as long as two tarsal joints, wings moderately narrow, quite a number of costals forked; three cross-veins basad of radial sector, six or more cross-veins connect anal to median sector. Male appendages scarcely one-fourth as long as last segment, cylindrical, divaricate, bristly. Length ♂, 43 mm.; ♀, 27 mm. Expanse 60 mm.

Mesilla, New Mexico, June (Morse); Estes Park, Colorado, August (Snow).

Brachynemurus tenuis n. sp.—Face pale yellowish, a large brown spot between and enclosing antennæ, and extending above from eye to eye, its upper margin indented in the middle, vertex pale yellowish, with two depressed dark dots near the middle; antennæ pale reddish brown, darker at tip; prothorax pale yellowish, with a brown stripe on each side reaching to the transverse furrow, and the side margin brown, rest of thorax pale, with an interrupted brown stripe each side, and a narrower one in the middle, sides pale, with several dark spots near the coxæ; legs pale, tarsi with brown at joints, and a few brown dots on hind femora; abdomen paler at base, darker towards tip, basal joints indistinctly trilineate, a pale spot on middle of last three segments; wings hyaline, forks of veinlets in hind part of fore wings marked with fuscous, median vein with about 22 quite large fuscous clouds, radius with a series of regular semicircular clouds to the pterostigma, not as large as those of median vein; basal part of radial sector wholly pale, costal veinlets clouded at tip, and many forks in apical part of wing clouded; hind wings with small dark clouds along the radius, and the median vein interrupted with dark, pterostigma whitish. Spurs as long as two tarsal joints; wings moderately narrow, not very acute, only a few costals forked before pterostigma, three cross-veins basad of origin of radial sector (four in one specimen). Male appendages one-half as long as last segment, but slightly divaricate and upcurved, slender. Length ♂, 35 mm. Expanse 47 mm.

Mesilla, New Mexico, June (Morse).

A very pretty species, readily known by the pale radial sector.

Brachynemurus coquilletti Currie.—Can. Entom., 1898, p. 93.

Two specimens from Coronado, California (July), agree with the description. It is readily known by the pale vein between radius and median. Distinguished from *B. tenuis* by broader wings at tips, absence of large spots on median, absence of spots on hind wings, different thoracic markings, shorter genital apparatus, etc.

The species of *Brachynemurus* known to me may be separated by the following table:

1. Labial palpi longer than head.....**longipalpi.**
   Labial palpi much shorter.....2.
2. Wings plainly yellowish, nearly evenly marked all over with small blackish points, hind femora scarcely, if at all, pointed with fuscous. **abdominalis.**
   Wings not plainly yellowish, dark spots mostly along radial and median veins.....3.
3. Abdomen plainly marked by large transverse pale spots.....**sackeni.**
   Abdomen not so marked.....4.
4. Two series of costal areolets almost to base of fore wings, none of fuscous points on wings very large, size medium.....**longicaudus.**
   Not two series of costals areolets as far to base of wings.....5.
5. No dark points at ends of cross-veins on hind part of fore wings, except at end of anal vein.....6.
   Many small points at ends of cross-veins in hind part of fore wings.....9.
6. Median vein without small cloud-like projections, labrum black. **nigrilabris.**
   Median vein with dark projections.....7.
7. Larger, darker, no fuscous markings on the forks of veinlets beyond end of cubital vein.....**ferox.**
   Medium size, paler, some fuscous marks on forks of veinlets beyond end of cubitus.....8.
8. Cubitus faintly marked, there is a series of clouded gradate veinlets starting from end of cubitus.....**peregrinus.**
   More dark on cubitus, the cross-veins from end of cubitus do not form a gradate series, paler than preceding.....**4-punctatus.**
9. Vein between radius and median (just behind radial sector) for a considerable part of its length pale.....10.
   The above vein interrupted with black or brown throughout.....11.
10. Radial sector on basal part wholly yellow, dark dots in hind basal part of fore wing are on the margin.....**tenuis.**
    Radial sector dark, dots in hind basal part of fore wing are mostly near anal vein.....**coquilletti.**
11. A vertical line between bases of antennæ, pterostigma of hind wings without a dark mark interiorly, many costals of front wings forked before the pterostigma.....**pumilis.**

A large transverse spot including the bases of antennæ, pterostigma of hind wings marked interiorly with black.....12.

12. Smaller size, scarcely any of the costals forked before pterostigma in fore wings, prothoracic stripes distinct.....**minusculus.**

Medium size, quite a number of the costals forked before pterostigma in fore wings, prothoracic stripes run together.....**centralis.**

Myrmeleon distans n. sp.—Black, head black, shining, mouth pale, some pale spots on vertex and a line close to the eyes; antennæ shining black, shorter than thorax; palpi short, last joint black: thorax yellow, with two submedian black stripes, and a broader stripe each side, which does not reach the anterior margin, lower sides with a black stripe, rest of thorax dark, with a few pale spots mostly on the sides; abdomen dull black; legs pale, the femora above on apical half black, tip of tibiæ and tarsi annulate with black; wings hyaline, veins dark, mostly interrupted with pale, no clouds, hind wings with subcosta, radius and median vein interrupted with pale, pterostigma of both pairs whitish, fore wings rather broad, hind pair much narrower, both acute at tips, eight cross-veins basad of radial sector in fore wings, two cross-veins connecting anal vein to fork of median. Expanse 60 mm.

Coronado Beach, California, July (Morse).

Most of the species of *Myrmeleon* are rather closely related to each other and hard to separate; I have found no good characters to separate *immaculatus* and *mobilis*.

1. Two oblique dark lines on the fore wings, one at end of median vein, the other at end of anal vein.....**ingeniosus.**

No such oblique dark marks.....2.

2. A pale stripe each side on thorax through the base of wings, size medium. **tectus.**

No such stripe on side of thorax.....3.

3. The anal vein and the sector of the median connected by three or four cross-veinlets, rather large species.....**immaculatus.**

The anal vein and the sector of median connected by two (rarely three) cross-veins.....4.

4. Cross-veins basad of radial sector mostly dark, rather larger species. **distans.**

Cross-veins basad of radial sector mostly paler, rather smaller species. **rusticus.**

LIMNEPHILIDÆ.

Limnephilus radiatus Say.—There is much variation in the extent of the dark markings of the wings in this species. I have seen but one specimen which agrees with Say's description, which seems to be an extreme in markings, usually most of fore wing, except the costal area, is mottled with dark brown, the anastomosis is always darker, there is a whitish spot on thyridium before the fork; the pale in base of fifth apical cell extends no farther out than than on the fourth and third which readily separates this species from *L. pacificus*), a semi-circular pale spot including apices of fourth and fifth apical and first and second subapical cells; apical part of first and second cells mostly pale, a whitish hyaline oblique spot across middle of thyridial and interclavial cells; pterostigma dark,

that of the hind wings quite distinct: in hind wings the subapical cells begin quite a distance beyond the base of discal cell. Body clothed with blackish hair, a few yellow ones on face and thorax. Expanse 34 mm.

Tacoma, Washington, September (Morse).

Limnephilus pacificus n. sp.—Head ferruginous, mostly with black hair, antennæ yellow-brown, thorax ferruginous, with black hair: abdomen fuscous; legs yellowish, with black spines; fore wings hyaline, with dark brown spots, mostly connate along lower edge of the radius; pterostigma and anastomosis dark brown, dark brown each side of thyridium, but interrupted obliquely in the middle by a whitish streak; hind portion of wing pale, except dark spots in sutural area; dark of thyridium is continued beyond anastomosis for half the length of the fifth apical cell; apicals and subapicals light yellow-brown, but large spots in base of apicals, that of the fifth apical extending outward nearly twice as far as the others, first and second apicals paler than others, the dark brown and light brown both contain whitish dots; there is a white spot in thyridium just before the fork; hind wings dusky at tip. Basal joints of antennæ twice as long as broad; wings not very long, obliquely truncate at tips; radius bent at pterostigma, anastomosis nearly straight, vein at base of subapicals plainly oblique, first subapical fully four times as far on thyridial as first apical on discal cell, seven spines basad of subapical spurs on hind legs; in hind wings the subapicals arise quite a distance beyond base of discal cell. Expanse 28 mm.

Tacoma, Washington; Temino, Washington; Portland, Oregon (Morse); Olympia, Washington (Kincaid).

Limnephilus luteolus n. sp.—Head yellowish, clothed with yellow hairs; antennæ rather darker; legs yellow, spines black; thorax yellowish, with yellow hair; abdomen fuscous; fore wings yellowish hyaline, darker yellowish on hinder portion of wing up to and in some points across the thyridium, indented on basal third by a curved, whitish hyaline streak; basal part of first subapical cell pale, a whitish spot on thyridium before the fork, apical cells beyond middle more or less mottled with dark; hind wings hyaline, slightly infuscated around tips. Basal joints of antennæ twice as long as broad, faintly tapering; fore wings rather long, apical margin slightly concave in middle, radius bent up just before pterostigma, first subapical cell more than three times as far on thyridial as first apical on discal cell; anastomosis nearly straight, vein at bases of subapical cells only slightly oblique; in hind wings the subapicals begin only a little way beyond the base of the discal cell; seven spines basad of subapical spurs on hind legs. Expanse 37 mm.

Tacoma, Washington, September (Morse).

In one specimen the fourth apical in hind wings is scarcely narrowed at base.

Limnephilus concolor n. sp.—Head yellowish, mostly with yellow hairs, some black bristles on vertex; thorax yellow, with black and yellow bristles; abdomen fuscous above, pale beneath; wings hyaline, mostly tinged with brown, space behind divisialis plainly darker; subapicals and apical two-thirds of apical cells darker, some dark dots behind radius and pterostigma brown, the brown everywhere dotted with many small irregular, hyaline spots; no sign of an oblique

pale streak across thyridium; a minute white dot on thyridium just before the fork as usual; tip of hind wing infuscated. Basal joint of antennæ about twice as long as broad; wings moderately long, apex not strongly truncate. anastomosis straight, vein at base of subapicals oblique, first subapical on thyridial fully four times as long as first apical on discal cell; the triangular cell in hind basal part of fore wings is fully three times as long as broad (longer than usual in the genus); subapicals in hind wings arise almost as far back as base of discal cell, fourth apical cell much narrowed at base; about five or six spines basad of subapical spurs on hind tibiæ. Expanse 28 mm.

Tacoma, Washington, September (Morse).

The species of the preceding genus may be arranged in groups about as follows:

1. Most of spines on tibiæ I yellow; the first branch of radius in hind wings is thickened in the middle (at least in ♂)...**hyalinus, indivisus.**
   Most of tibial spines black, no such thickened vein in hind wings.....2.
2. Some dark spots along the hind edge of the radius.....3.
   Without such spots.....**ornatus, luteolus.**
3. No oblique pale streak across the middle of thyridium.....**concolor.**
   An oblique pale streak across middle of thyridium.....**combinatus, radiatus, pacificus, nebulosus, gravidus.**

L. gravidus may, perhaps, be more properly classed as an *Anabolia*, for in the hind wings the fourth apical is but little narrowed at base, and the fore wings are scarcely truncate at apex.

Goniotaulius coloradensis n. sp.—Black, antennæ and palpi black, femora black, extreme tips and rest of legs pale yellowish or whitish, a black spot on under side of tibiæ I, black spines on tibiæ, and two black bristles just before tip of fore femora, scattered yellowish hair on the head and thorax; wings pale hyaline, rather brownish along posterior margin and most of region beyond anastomosis, sometimes leaving a pale streak oblique upward and a narrower downward, sometimes mostly brownish, with a large pale area around anastomosis and some elongate basal dots; pterostigma darker brown; hind wings hyaline, rather obscure at tips. Antennæ much shorter than the wings, fore wings moderately narrow, obliquely truncate at tip, the anastomosis zigzag. Male appendages short, complicated, the superior pair short, straight, blunt-pointed. Expanse 18 mm.

Fort Collins, Colorado (Baker).

Anabolia decepta n. sp.—Head brown, with black hairs, some yellowish ones on face; antennæ brownish, basal joints rufous, with black hair; thorax brown; legs yellowish; femora brownish; abdomen brown; wings hyaline, suffused with light brown, a white streak from discal cell across thyridial and interclavial areas; bases of apical cells pale; anastomosis and pterostigma dark brown, and some dark brown spots along the radius and divisialis, the light brown of apical part of wings irrorate with hyaline, costal area immaculate, except toward pterostigma, a white dot on thyridium just before the fork. Wings rather long and narrow, discal cell but little longer than its pedicel, anastomosis nearly

straight, first subapical on thyridial fully three times as far as first apical on discal cell, vein at base of subapicals nearly straight, in hind wings the fourth apical is nearly as wide at base as the second apical cell; about eight spines basad of subapical spurs on hind tibiæ; male genitalia very peculiar, each side piece is two-forked, the both erect, the apical one larger and more pointed. Expanse 23 mm

Olympia, Washington (Kincaid).

Stenophylax brevipennis n. sp.—Black, clothed with scattered black bristles and yellowish hairs; mouth and palpi ferruginous; antennæ ferruginous, basal joints dark brown; posterior margin of vertex ferruginous; legs dirty yellowish, brown on femora and tips of hind tibiæ, black spines and yellow spurs, two black bristles just before tip on anterior femora, and underneath is a row of short black hairs; wings hyaline, marked with brown, some small spots along the subcosta, a few on discal area, hinder portion nearly filled with brown, leaving only small pale dots, apical cells slightly reticulate with brown in their tips, pterostigma of both pairs brown, rest of hind wings hyaline, sometimes the brown is spread over nearly all the wing, except costal area, fore wings short and broad, rounded at tips, anastomosis nearly straight. Male appendages yellowish, superior pair black at tips, large, truncate, seen above deeply cleft, below concave, inferior pair shorter, upturned, acute at tip. Expanse 20 mm.

Colorado (Baker).

Chilostigma pallida n. sp.—Head pale yellowish, with pale yellow and some scattered blackish hairs; thorax yellowish, with pale yellow hair; legs pale yellowish, spines black; abdomen brown; wings hyaline, hinder half of the apical part beyond anastomosis irrorate with pale yellow-brown markings, pterostigma very prominent, large, yellow-brown, veins yellow; hind wings hyaline; antennæ rather fine and short; spurs 1-2-2; wings moderately broad, truncate at tip, the pterostigma elevated, the radius strongly curved at that point, the first apical cell at base swollen above, and not extending along side of discal cell at all, the anastomosis being very straight, not indented by third apical, which is as broad at base as the fourth apical, fifth apical acute at base, not extending along thyridial cell, vein at base of subapicals nearly straight, the discal cell is slightly less than twice as long as its pedicel, in hind wings the fourth apical is scarcely narrowed at base. Expanse 32 mm.

Ithaca, New York.

Halesus magnifica n. sp.—Face reddish, with yellow hair, vertex darker, with pale yellow hair on hind margin; antennæ red-brown, basal joint nearly black; thorax dark, with long pale yellow hairs on base; legs yellowish, femora more rufous, spines black; abdomen ferruginous, fuscous at base; wings thickly marked with large dark brown spots, basal part of costal space mostly clear, extreme base of wing clear, and a large nearly clear space across middle of discal cell, thyridial and interclavial areas, several large spaces in the bases of the apical cells, the apical portion of third apical and first subapical cells mostly clear, elsewhere the brown is thickly broken up by hyaline roundish spots, often two or more are connate, a rather yellowish space before dark pterostigma; hind wings wholly hyaline, with long whitish fringe at anal margin,

fore wings rather long, the apical margin very oblique and quite long, discal cell nearly twice as long as its pedicel, anastomosis nearly straight, vein at bases of subapicals oblique, first subapical cell is fully three times as far on thyridial as first apical on discal cell, the third apical is narrow at base, but does not indent the anastomosis, in hind wings the third apical is narrow at base, but the fourth is about as wide as second; about ten spines basad of subapical spurs on hind legs. Expanse 50 mm.

Olympia, Washington (Kincaid).

SERICOSTOMATIDÆ.

Helicopsyche californica n. sp.—Head with mostly white hairs, a bunch of black ones over each eye; palpi mostly black haired; antennæ pale yellowish, basal joint with long whitish hair and some black; thorax with mostly whitish hair; abdomen brown, with gray hair; legs with short, almost scale-like hairs, first pair darker than others, the femora dark at base, and the tibiæ at tip, the tarsi black and white, the other tarsi less marked with black, the other femora mostly pale, the other tibiæ a little infuscated; fore wing rather densely clothed with black and yellowish hair, giving the surface a shining appearance, apical fringe jet black, quite long and prominent at lower apical angle, hind wings blackish, with long blackish fringe; antennæ short, stout, basal joint about as long as head, erect; fore wings moderately short (plainly shorter than in *H. borealis*), hind wings short, narrow (like *H. borealis*); venation similar to *H. borealis*. Expanse 10 mm.

Colton, California (Morse).

Oligoplectrum americanum n. sp.—Head and thorax brown, above on vertex long yellowish hair arising in groups; antennæ pale, annulate with brown; palpi with yellow and black hairs; legs yellowish, with short yellowish hair and short yellow spurs, 2-2-2; wings gray, with a pale spot at anal angle, and one in tip of first subapical cell, indistinct ones in tips of first and second apical cells, pterostigma darker than elsewhere, rather blackish basad of pale anal spot, hind wings uniform gray; abdomen blackish, with short whitish hairs in rings; antennæ rather shorter than wings, stout, basal joint stout, scarcely as long as head; face concave, with a median ridge; palpi of ♂ cylindrical, slender, upcurved and near the face; head rather broad; fore wings moderately broad, discal cell short, not one-third the length of its pedicel, radius bent suddenly at beginning of pterostigma, cross-veins at base of subapicals very oblique; hind wings about as broad, but much shorter than fore pair, discal cell open, not even narrowed; abdomen short; appendages short, a superior median emarginate plate covering them from above. Expanse 18 mm.

Franconia, New Hampshire (Mrs. A. T. Slosson).

Silo cinereus n. sp.—Head brown, with long black and white hair, not very dense; palpi slender, dark, with a few white hairs; basal joint of antennæ dark, with long white and a few black hairs, beyond pale, very distinctly annulate with brown, thorax black, with some gray hair; abdomen brown; legs yellowish, anterior femora rather darker in the middle; wings gray hyaline, scantily clothed with short yellowish and gray hairs, a dark dot in base of third apical cell. Spurs 2-4-4, subapical pairs of intermediate and hind legs beyond

the middle; antennæ much shorter than wings, basal joint much longer than head; fore wings long, slender, acute at tip, hind pair a little shorter, scarcely narrower, no anal area, long fringed toward the base; discal cell of fore wings slender, slightly shorter than its pedicel, and much shorter than apical cells, first apical cell on discal cell more than one-half as far as fifth apical on thyridial cell, third apical broader at base than the second or fourth, veinlet at base of subapicals very oblique, in hind wings the discal cell is plainly shorter than its pedicel, and scarcely one-half the length of the apical cells, second subapical pedicellate. Expanse 17 mm.

Gazelle, California, September (Morse).

Mormonia pictilis n. sp.—Head brown, with some black hairs on front and long yellow hair above; palpi pale, with yellowish pubescence; antennæ black, faintly annulate with pale, basal joint black haired; thorax dark, with yellow and black hair; abdomen brown, the ventral segments margined with pale; legs pale yellowish, with yellowish spines; wings gray, with yellowish and black hairs and a gray and black fringe, a dark cloud over anastomosis, hind border narrowly dark to the anal angle, where there is a whitish spot, apical margin with elongate whitish spots between the veins, darker on veins, hind wings uniform gray, with gray fringe. Antennæ short, fine, basal joint about as long as head, spurs 2–4–4, subapical pair on hind leg much beyond the middle; wings moderately long, apex rounded, hind pair but slightly shorter, discal cell in both pairs closed, in fore pair indistinctly, the cell (in both pairs) elongate, but much shorter than its pedicel. Expanse 15 mm.

Franconia, New Hampshire (Mrs. A. T. Slosson).

Differs from both described species (*M. togata* and *M. vernalis*) by darker antennæ, and more maculate wings, and from the former by shorter basal joint of antennæ.

Geora calcarata n. sp.—Head yellowish, with yellowish hair, some black hair below eyes; palpi and antennæ pale yellowish; legs pale yellowish, the spines reddish brown, distinctly contrasting with the pale tibiæ; thorax and abdomen dark, former with pale yellowish hairs; wings hyaline, veins yellowish, with black hairs, shorter yellowish hairs on surface of the wings. Head broad; basal joints of antennæ longer than head, widely separated at base, between them and rather above is a double wart, and two large, broad, low warts on vertex near each eye, fore wings moderately long, rather pointed, hind pair much shorter, not broader than fore pair, and with a long fringe towards base, discal cell of fore wings short, indistinctly closed, fifth apical cell pedicellate, veinlet at base of subapicals very oblique, area interclavialis enlarged at tip (as in the European species), in hind wings the discal cell is open, not even constricted, fifth apical cell pedicellate. Expanse 20. mm.

Sea Cliff, New York, July.

NEROPHILUS n. gen.

Spurs 2–4–4; maxillary palpi rather long, second and third joints of ♀ very stout, rest shorter and more slender; basal joints of antennæ much longer than broad; wings rather broad, hind pair

but little shorter, discal cell of fore pair slender, closed, of hind pair shorter, closed, in each of the fore wings the veinlet behind the third apical cell is, for the most part of its middle, divided, forming a slender cell (possibly this is only an aberration).

Nerophilus oregonensis n. sp.—Black, head rather densely clothed with yellow hair; basal joints of antennæ black, with yellow hair, rest of antennæ with short yellow hair, and a pale brown ring at tip of each joint, basal joints of palpi pale, with yellow hair, apical joints darker; legs pale yellow, intermediate and hind femora fuscous on basal half; thorax black, with yellow hair; abdomen brown; fore wings rather blackish, the anal veins and the basal part of the radius black, elsewhere the veins are paler, surface with black hair and yellow or golden between the veins, most prominent on basal pair; hind wings quite black, with black fringe, wings rather broad, discal cell of fore pair slender, much longer than its pedicel, but shorter than the apical cells, fifth apical and first subapical are pedicellate, in hind wings the discal cell is shorter than its pedicel, and less than one-half the length of apicals, seven apical cells in hind wings, all narrow at base, and radiating from the ends of discal and thyridial cells; subapical spurs on hind and intermediate tibiæ are much beyond the middle. Expanse 26 mm.

Grant's Pass, Oregon, September (Morse).

PRISTOSILO n. gen.

Spurs 2–4–4; maxillary palpi of ♂ broad, upcurved, and masking the face, densely clothed outside with scale-like hairs; antennæ much shorter than wings, basal joint rather longer than head; fore wings quite narrow, hind pair a little shorter, scarcely broader than fore pair and without anal field, discal cell of fore wings long and closed, of hind wings much shorter and closed, hind wings and costal area of fore pair clothed with scale-like but rather slender hairs; size small.

Pristosilo canadensis n. sp.—Gray, palpi, face and basal joints of antennæ with yellowish gray scale-like hairs, and the latter with longer yellowish hair, rest of antennæ pale yellow; vertex and thorax with groups of long pale yellowish hairs; legs yellowish; abdomen fuscous, appendages yellowish; wings gray hyaline, with gray hairs and yellow-gray scale-like ones on costal area of fore pair and over whole of hind pair, fringe gray, interrupted with black; antennæ rather short and stout, basal joint longer than head; legs rather short, subapical spurs on hind and intermediate pairs much beyond the middle; wings rather narrow, discal cell long, narrowed at tip, about as the pedicel, apical cells about as long, first subapical much longer, discal cell of hind wings shorter, about as long as its pedicel, apical cells twice as long; inferior male appendages long, forcipate upcurved. Expanse 14 mm.

Sherbrooke, Canada, June (Bégin).

PSILOTRETA n. gen.

Spurs 2-4-4; subapical pair on intermediate tibiæ before the middle; palpi of male long, densely clothed with long hair in rather vertical rows, those on second joint mask the face; basal joint of antennæ as long as head; fore wings long and narrow, hind pair shorter and with a folded anal region, discal cell in both pairs very long, and open or indistinctly closed, third apical of fore wings short pedicellate, first apical very much longer than the second, third apical in hind wings pedicellate.

Psilotreta frontalis n. sp.—Head brown, with black hair; second joint of palpi with long and dense, black and gray hair on upper and inner sides; rest of palpi less pilose; antennæ yellowish; thorax and abdomen brown; legs yellowish; wings gray hyaline, with short gray and yellow hairs, basal joint of antennæ about as long as head, with short hair; fore wings long, slender, rounded at tip, discal cell very long, three times as long as its pedicel, scarcely closed, first apical cell extending nearly one-half way upon discal cell, third apical short pedicellate, veinlet at base of subapicals angulate, in hind wings there is a large folded anal region, the hind margin is long fringed, the discal cell is slightly narrowed at tip, but scarcely closed, twice as long as its pedicel, third apical cell short pedicellate. Expanse 23 mm.

Sea Cliff, New York, June.

LEPTOCERIDÆ.

The principal section of this family is that defined by having the spurs not more than 2 2-2. The genera of this section known to me may be separated as below:

1. Hind wings with fork five absent, thyridial cell absent, hind wings moderately narrow ..... **Triænodes.**
   Hind wings with fork five present ..... 2.
2. Fore wing bent transversely near tip, first apical cell long, hind wings quite broad, black species ..... **Mystacides.**
   Fore wings not so bent ..... 3.
3. Venation different in the sexes, in fore wings in the female the superior branch of upper cubitus is twice forked, making fourth and fifth apical cells both pedicellate, in male only fourth apical cell pedicellate, hind wings very broad, spurs 2-2-2 ..... **Leptocerus.**
   Venation not different in the sexes, fourth and fifth apical cells never both pedicellate, spurs 1-2-2 or 0-2-2 ..... 4.
4. Hind wings very broad, veins on costal portion of hind wings (before fork five) obsolete, in fore wings first and fourth apical cells both pedicellate, white or pale species ..... **Leptocella.**
   Hind wings not so broad, veins on costal portion distinct, not white species .. 5.
5. Superior branch of upper cubitus simple in fore wings, hind wings broader. **Œcetina.**
   Superior branch of upper cubitus forked, wings very long and narrow, with acute tips ..... **Setodes.**

The species of this section known to me are as follows:

Trisenodes—ignita, grisea.
Mystacides—nigra, atra, punctata. 4-fasiata.
Leptocerus—indecisus, resurgens, mentiens, dilutus, transversus, flaveolatus, maculatus.
Leptocella—exquisita. uwarowii, albidus. piffardii, coloradensis.
Œcetina—incerta. parvula, fumosa, floridana, avara, flavida.
Setodes—americana.

Trisenodes grisea n. sp.—Head ferruginous, vertex rather blackish; palpi gray; antennæ pale yellowish, tips of joints blackish, basal joint ferruginous, some yellow hairs on head; thorax black, above with some yellow hairs; abdomen yellowish, slightly brownish above; legs yellowish gray, paler toward tips, joints of tarsi scarcely darker at tips; wings uniform yellowish gray, scantily clothed with grayish yellow hairs, with darker gray fringe on apical margin of fore pair and on posterior margin of hind pair, veins paler, fore wings moderately long, costal margin rounded, hind margin straight, discal cell closed, the upper branch forked nearer to cell than to tip of wing, the lower branch simple, terminating before tip of wing, hind wings with discal cell closed, the upper branch forked nearer to tip than to the cell. Expanse 23 mm.

Denver, Colo. (Baker, Cockerell).

Leptocerus maculatus n. sp.—Head with a bunch of black and white hairs under and one above each eye, some white hairs on middle of vertex; palpi brown and white; antennæ white, distinctly annulate with black; thorax with several groups of black and white hairs; abdomen green: legs white, tarsi all annulate with black, and the anterior tibiæ black on outside, and intermediate tibiæ rather blackish on outside also; fore wings clothed with black hair, with scattered white patches, most prominent on middle and basal part of wings, fringe long and black, hind wings gray, with long gray fringe; antennæ scarcely twice as long as wings; palpi long; abdomen short and large, spurs 2-2-2, fore pair short but distinct; fore wings short, rounded at the tip, discal cell about length of its pedicel, first apical cell twice as long as its pedicel, the fourth apical cell has a pedicel rather shorter than itself, while the third apical arises from the middle of the pedicel of the fourth; hind wings shorter and scarcely broader than the fore pair, first apical cell long pedicellate, fourth apical cell short pedicellate, all of the veins distinct. Expanse 15 mm.

Washington, District of Columbia, August.

LEPTOCELLA n. gen.

Venation alike in the sexes, fore wings long and narrow, hind wings very broad, veins of costal region of hind wings (before fork five) are obsolete, fork five present, spurs 1-2-2 or 0-2-2, first and fourth apical cells of all wings are pedicellate, second and third joints of palpi long, subequal, fourth smaller and rather shorter, fifth still shorter.

This genus is easily known by the obsolete veins in costal half of the hind wings.

Type *L. uwarowii.*

Leptocelia coloradensis n. sp.—Head yellowish; basal joints of antennæ same color, other joints narrowly annulate with brown; thorax rather reddish; abdomen pale at base, darker toward tip; legs pale yellowish; wings hyaline, rather shining, very scantily clothed with short pale hairs, hind pair with rather short pale fringe; antennæ twice as long as wings, basal joints very large, swollen above; spurs 0-2-2, fore wings long and narrow, discal cell slender, but much shorter than its pedicel, longer than apical cells, first apical rather shorter than its pedicel, fourth apical short pedicellate, hind wings much shorter than fore pair, with a broad folded anal space, veins on anterior part indistinct. Expanse 24 mm.

Colorado (Baker).

Setodes americana n. sp.—Palpi with black hair; antennæ white beyond the basal joint, annulate with black; thorax dark, with white hairs; abdomen brownish; legs pale yellowish, anterior pair darker, fore wings with black hair and blackish veins, and a black fringe; in well-marked specimens some whitish dots on hind part of wing, a larger one at anal angle; hind wings gray, with long dark gray fringes; antennæ very long and slender, two and one-half times as long as wings; fore wings long and slender, acute at tip, no closed discal cell, first apical cell pedicellate, fourth apical cell acute at base, no fifth cell, hind wings rather narrow, and a little shorter than fore pair, acute at tip, three main veins, each forked, the upper branch of first forked again near tip, first and second connected just before the first fork. Expanse 13 mm.

Washington, District of Columbia, July.

ŒCETINA n. gen.

Differs from the typical *Œcetis* by having a much longer discal cell, and in the first apical reaching anastomosis, hind wings are not very broad.

Type *Œ. incerta.*

Œcetina incerta Walk. (*micans* Hag.).—Wings not densely clothed with hair, rather subnude, luteous, anastomosis brown, discal cell not extending much beyond thyridial cell, fifth apical cell does not extend along thyridial basad of anastomosis, thyridial cell less than one-third longer than discal cell. Expanse 17 mm.

Long Island, New York, July; Washington, D. C.

Œcetina parvula n. sp.—Head and thorax brown, with gray hair; palpi gray; antennæ pale, annulate with black; legs pale yellowish; abdomen greenish; wings with black hair and fringe, anastomosis brown, fore wings slender, acute at tip, discal cell projecting a little beyond thyridial cell, fifth apical not extending on thyridial cell, no distinct mark on base of discal cell, thyridial cell not much longer than discal cell. Expanse 11 mm.

Washington, District of Columbia.

Distinguished by its small size and short thyridial cell, smaller and more hairy than *Œ. incerta,*

Œcetina flavida n. sp.—Yellowish, head, thorax and palpi clothed with pale grayish hair; fore wings quite densely clothed with short yellow hair and with gray fringes, anastomosis only a little infuscated, fore wings long and acute, discal cell only a little way beyond thyridial cell, the anastomosis being almost continuous and oblique, thyridial cell almost one-half longer than discal cell, the fifth apical cell not extending upon the thyridial cell. Expanse 16 mm.

Kissimmee, Florida, November.

Separated from *Œ. incerta* by yellowish fore wings, with less distinct and more continuous anastomosis, and the longer thyridial cell.

Œcetina fumosa n. sp.—Head and thorax brown, with gray hair; antennæ pale, annulate with black; legs luteous, first pair darker; palpi brown, with gray hair; abdomen greenish; wings more densely clothed than other species with black hair, anastomosis black, and usually with three black spots, one at base of discal cell (always present), one at base of thyridial cell, and one in middle of hind margin of thyridial cell, the basal half of the radius is usually black, fringes gray; tip of hind wings slightly fumose. Fore wings not very acute at tip, the discal extends quite a little beyond the thyridial cell, but the latter is more than one-half longer than discal cell, the fifth apical extends quite a ways on the thyridial cell (much farther than in other species). Expanse 17 mm.

Washington, District of Columbia, July, August.

Œcetina floridana n. sp.—Grayish; antennæ rather paler, annulate with brown at tips of the joints, much more than twice the length of the wings, basal joint clothed with white hair; legs yellowish gray, spurs 1-2-2; fore wings very long and slender, acute at tips, hinder pair broader and much shorter, fore pair clothed with yellowish gray hair, and some white and black hairs along the veins, three indistinct whitish spots on the posterior apical margin, posterior margin with a fringe of yellowish gray and black hairs, all the apical cells reach the anastomosis, and are of subequal width at base, except the first which is acute, fifth apical extends a little way on thyridial, hind wings scantily clothed with yellowish hair, and a rather long yellowish gray fringe, fork five present in hind wings, as well as three in front of it, first apical cell extending back on the discal. In the ♂ genitalia there is a large median corneous piece, deflexed rather beyond its middle, and acute at tip. Expanse 19 mm.

Biscayne, Bay, Florida (Mrs. A. T. Slosson).

HYDROPSYCHIDÆ.

Hydropsyche gracilis n. sp.—Head blackish, face with whitish hair; basal joint of antennæ brown, rest pale yellowish, obliquely and faintly annulate with brown; palpi brown; legs pale yellowish; thorax and abdomen dark brown; wings gray hyaline, with gray hairs and gray and black fringe, the black mostly at ends of veins. Fore wings rather long and slender, apex rounded, venation as usual, the discal cell less than one-third the length of the apical cell beyond it; hind wings rather short, not very broad, but broader than fore pair, broadest in the middle, the first and second forks are near the outer

fourth of the wing, the next two forks are near the middle of the wing, the upper branch of radial sector being simple (not forked just before tip as in many species). Expanse 15 mm.

Fort Collins, Colorado (Baker).

Separated by its small size, unmarked and slender wings, etc.

Hydropsyche californica n. sp.—Head brown, with whitish hair, a cluster of black hairs over each eye, and another cluster on each anterior corner of the mesothorax, rest of thorax whitish haired; palpi dark at base, rest pale; antennæ pale, obliquely annulate with brown; abdomen rather pale, with a narrow dark stripe each side; legs pale yellowish, base of hind femora rather blackish; wings gray hyaline, more or less marked with black on costal area and along the cubitus, apical portion of wing marmorate with white and brown, anal region also sometimes mottled. Fore wings moderately short and broad, tip of wing rounded, venation as usual, discal cell about one-third the length of the apical cell beyond it, hind wings broader than fore wings, broadest in middle, upper branch of radial sector forked just before the tip. Expanse 18 mm.

Tehama, Cala., August; Gazelle, Cala., September (Morse).

Psychomyia pulchella n. sp.—Head, thorax and palpi dark brown; antennæ pale, annulate with brown; legs pale yellowish; wings gray hyaline, with short gray hair and a gray fringe. Head with a rounded wart on the vertex just above each eye; antennæ about one-half length of wings; pronotum with a small tubercle each side; mesonotum with a double depression, in each a rounded wart, and behind on mesoscutellum is a broader depression with a small triangular wart in each side; spurs 2-4-4, long; fore wings rather long and slender, subacute at tips, hind wings shorter, slender, and with a long fringe behind, in fore wings the radial sector has the upper branch short forked, the lower branch much longer forked, both ending before tip of wing; upper branch of the cubitus forked just beyond the cross-vein. Expanse 8 mm.

Fort Collins, Colorado (Baker).

RHYACOPHILIDÆ.

AGARODES n. gen.

Spurs 2–2–4, subapical pair on hind legs much beyond the middle, scarcely twice their length basad of apical pair; no ocelli; vertex with two prominent, oblong, oblique warts; antennæ shorter than wings, stout at base, basal joint short and stout, much shorter than head; pronotum with two warts; maxillary palpi rather long, hairy, last joint short but slender; fore wings not very narrow, hind wings shorter, but scarcely narrower, discoidal cell of both wings open, cross-veinlets few and indistinct, but the thyridial is closed in both wings, and the veinlet closing it gives off near the middle a vein to margin of wing; short black spines on all tibiæ, but mostly concealed by the pubescence; size moderate.

This genus would appear related to *Berœa*, but differs in much larger size, in small basal joint of antennæ, shorter antennæ, spines on tibiæ, etc.

Agarodes grisea n. sp.—Head pale brown, a small wart under each eye, a larger one just above and between bases of antennæ, a large, oblong, oblique one each side on vertex, with its fore end nearest the eye, and two transverse ones on the pronotum, all crowned with long yellowish hair; antennæ clothed with short black hair; thorax and abdomen fuscous; genitalia reddish; legs pale, clothed with short yellowish hairs; palpi with yellowish hair; wings grey, veins mostly yellowish, surface with yellowish hairs at base, more blackish hairs on apical part, veins with black hair, fringe grey, with some black at anal angle. Discal cell connected near middle to the radius by an indistinct veinlet, discal cell open (but microscopic examination shows traces of a cross-vein), where there is a whitish hyaline spot; hind wings grey, with yellowish hair and grey fringe, long on hind margin toward the base; male superior appendages slender, inferior stouter, toothed. Expanse 26 mm.

Sea Cliff, New York, June.

THE NORTH AMERICAN MUTILLIDÆ.

BY WILLIAM J. FOX.

The following paper is the result of a short study of our Mutillidæ, with a view to a classification of the genera. It has been my opinion for some time that existing classifications are unnatural, inasmuch as some of the genera at present indicated, have apparently no constant generic characteristics. In fact, one is almost convinced by an examination of the family that no really serious study has been made regarding it. If *Smicromyrme*, *Sphærophthalma*, *Photopsis* and *Pseudomethoca* were held as valid genera it would be necessary to form one or two genera for forms which will not fit under those heads as now defined. *Sphærophthalma scæva*, *pennsylvanica* and *auripilis* are examples, which, in consequence of the mandibles, would be referred to *Photopsis*, but on account of the small ocelli are equally referable to *Sphærophthalma*.

What have been hitherto supposed good characteristics will be found to vary in studying a series. The round eyes of typical *Sphærophthalma* merge gradually into ovate ones, and exotic species are known which have the eyes partly facetted. The dentition of mandibles in the female sex of that supposed genus is not constant. Usually there is a small tooth present within near the apex, but in many examples this will be found indistinct or absent entirely; in the latter case the mandibles present a falcate appearance. The only real difference in the mandibles is to be found in those species representing *Photopsis* (as restricted by Fox and Ashmead), in which they are peculiarly and heavily built, being broadened at apex, which possesses either two or three teeth. But this characteristic is also found in three species otherwise referable to *Sphærophthalma* (in the small ocelli, etc.). These species *scæva*, *pennsylvanica* and *auripilis* also agree with *Photopsis* in the unarmed first ventral segment and shape of marginal cell. Clearly these have as high a claim to generic rank as *Photopsis*. They are the evidence, in my mind, that proves the unity of *Sphærophthalma* and *Photopsis*.

As to *Pseudomethoca*, that has not as much claim to generic rank as *Photopsis*. It has been defined as having two submarginal cells, two discoidal cells, and with the marginal acuminate. That these

are inconstant characters is proven by our own species of *Mutilla* (sens. lat.). Considering the round-eyed species only (representing *Sphœrophthalma*), the number of submarginals is variable in the different species. Generally the third submarginal, if not distinct, is faintly marked; it is rarely as distinct as the second. This characteristic occurs in species with the marginal cell truncate, and in some with it acuminate (*propinqua*, *oceola*); and we find species with two submarginal cells and a truncate marginal (*fulvohirta*). The same type of mandible seems to exist in *Pseudomethoca Cressonii* and in *Sphœrophthalma fenestrata*, i. e., bidentate, or in other words, with a tooth before the apex on inner margin.

It is not the present writer's intention to assert that the form and dentition of the mandibles are entirely valueless as characteristics; they can be used to some extent in separating the groups into which I have arranged *Mutilla*, as in the groups *hexagona* and *scrupea*, in both of which the dentition of the ♂ mandible differs.

In the present work an almost complete series of the species of America, north of Mexico, has been available, including the types of Blake, Cresson, Ashmead and others, as well as a number of Mexican and South American species.

The author acknowledges with thanks the loan of valuable material from Wm. H. Ashmead.

The Mutillidæ is divisible into subfamilies as follows:

FEMALES.

Thorax of ♀ not divided, at least not on its upper surface.....**Mutillinæ.**
Thorax of ♀ divided into two or more parts.....**Thynninæ.**

MALES.

Tip of abdomen beneath supplied with two slender appendages....**Mutillinæ.**
Tip of abdomen otherwise supplied.....**Thynninæ.**

1. Subfamily MUTILLINÆ.

This subfamily consists of one vast genus *Mutilla* Linné, of which twelve groups are at present known from the United States. Several of these have been described and given generic rank, but a study of them with a large series shows that such a course is not tenable, as they intergrade to an extent which renders a sharp line of demarkation impossible. Closely related groups will be found in both the tri- and bidentate mandibled series; thus the group *asopus* with tridentate mandibles is remarkably close to group *occidentalis*,

in which the mandibles are bidentate, and the other groups of the tridentate series seem closer to groups *imperialis*, *hexagona*, etc., than to *asopus*. A natural arrangement of the groups therefore is apparently not possible.

The American generic names which fall into the synonymy under *Mutilla* are as follows:

Ephuta Say = group *occidentalis*.
Mutilla (Linné) Blake = groups *hexagona*, *scrupea*.
Agama Blake (subsequently changed to *Photopsis* Blake) = groups *imperialis* and *anthophoræ*.
Sphærophthalma Blake = groups *occidentalis*, *pennsylvanica*, *asopus*, *waco*, *canadensis*, *simillima*, *grandiceps*.
Photopsis Blake = groups *imperialis* and *anthophoræ*.
Pseudomethoca Ashmead = groups *simillima*, *canadensis*.

Ephuta Say seems to have been overlooked by Blake when he named *Sphærophthalma*, as it has priority. The groups represented by *Pseudomethoca* Ashmead are the American representatives of *Myrmilla* (Wesm.) André.

The groups into which the North American species of *Mutilla* are divisible are as follows:

Mandibles tridentate in both sexes.
  First and second abdominal segments sessile.
    Wings of ♂ rudimentary; ♀ thorax not crenulated....Gr. **grandiceps.**
    Wings of ♂ normal; ♀ thorax crenulated laterally.
      No pygidium in ♀; wings with two submarginal cells.
        Gr. **canadensis.**
      A pygidium in ♀; wings with a tolerably distinct third submarginal cell.
        Gr. **simillima.**
  First abdominal segment smaller than second, not sessile.
    Wings rudimentary.....Gr. **waco.**
    Wings normal.....Gr. **asopus.**
Mandibles bidentate, or in some females edentate; if tridentate they are very robust and almost abnormal (groups *imperialis*, *anthophoræ*, etc.), and the teeth are situated at apex.
  Eyes not emarginate anteriorly, rounded or reniform.
    Eyes round, polished, not facetted; marginal cell truncate; mandibles not thickened in ♂.....Gr. **occidentalis.**
    Eyes irregularly rounded, or reniform, generally facetted: mandibles robust in ♂.
      Ocelli small, round, no pygidium in ♀.....Gr. **pennsylvanica.**
      Ocelli large, the anterior one reniform; ♀ with distinct pygidium.
        First abdominal segment (♀) smaller than second, more or less nodose; in ♂ the first and second segments similarly sculptured,
          Gr. **imperialis.**
        First and second abdominal segments (♀) sessile; first segment of ♂ more coarsely sculptured than second.....Gr. **anthophoræ.**

Eyes emarginate anteriorly, facetted.
First and second abdominal segments sessile.....Gr. **hexagona.**
First segment smaller than second, more or less nodose.....Gr. **scrupea.**

The female of group *asopus* is not known.

1. Group *grandiceps.*

Head large, wider than thorax, armed more or less with stout spines. Scape long and slender. Eyes subovate. Mandibles long and narrow tridentate, two small teeth being situated on inner edge before the acute apex. First abdominal segment sessile with second. No pygidial area. Thorax laterally (♀) not crenulated. Wings of male greatly abbreviated, not equalling the thorax in length.

But one species of this group is known and is easily distinguished by the characters given above.

1. **Mutilla grandiceps** Blake.
Mutilla grandiceps Blake, Tr. Am. Ent. Soc., iv. 74. ♂, 1872.
Sphærophthalma grandiceps Blake, ibid, xiii, 344, ♀ ♂, 1886.

Texas. In general appearance this species is not unlike the agricultural ant *Atta.*

2. Group *canadensis.*

Agrees closely with the preceding group, differing in the crenulated thorax of female and shorter, heavier mandibles. The male has the wings fully developed, with two submarginal cells, there being no trace of a third; the marginal cell is acuminate; eyes subreniform.

So far as known the males of this group have the body entirely black.

FEMALES.

Head more or less spined.....2.
Head not spined.....4.
2. Postero-lateral angles of head dentate, the cheeks with a spine.....3.
Postero-lateral angles of head bearing a carina, which terminates below in a sharp spine; abdomen from apex of segment 2 blackish.
canadensis Blake.
3. Head and thorax above, the former especially, covered with appressed, silvery pubescence; postero-lateral angles of head sharply dentate.
Tommeyi Fox.
Head and thorax without appressed pubescence: postero-lateral angles of head acute, but not strongly dentate.....**nephele** n. sp.
4. Greater part of abdomen ferruginous, the silvery maculation, if present, thin, not very distinct.....5.
Abdomen black, except first and last segments, and the second ventral which are ferruginous; silvery pubescence dense, consisting of a transverse

spot at base and apex of second dorsal and two rounded spots laterally, and segments 3-5 entirely; segment 6 with reddish pubescence; tibiæ and tarsi blackish..... **Wickhami** Ckll.

5. Second dorsal segment with silvery ornamentation.....6.
Second dorsal segment without silvery ornamentation, the pubescence, if present, scattered, not taking a definite form.....8.

6. Second dorsal with two rounded silvery spots. Length 3½ mm.
scævolella Ckll.
Second dorsal otherwise maculated. Length 7-10 mm.....7.

7. Second dorsal with a large basal and apical dark macula connected by a narrow line, thereby making the form of an hour-glass; the remainder of segment filled in with silvery pubescence; punctures of thorax coarse, but rather close, not running into reticulations posteriorly.
connectens Cress.
Second dorsal with a transverse bar of thin silvery pubescence a little behind middle, which is extended near each side into a narrower stripe almost to base of segment, so ⊥⊥; thorax with distinct reticulations posteriorly.....**contumax** Cress.

8. Head densely covered with appressed pale pubescence; second segment ferruginous, with sparse silvery pubescence, that of thorax above sparse and blackish.....**præclara** Blake.
Head with some sparse hairs; second segments bright orange, without silvery pubescence; thorax above almost bare medially, but bordered by silvery pubescence (scutellar scale large).
donæ-annæ Ckll. and Fox.

MALES.

Head rounded behind in such a manner that no postero-lateral angles whatever are evident, roughly and densely punctured; punctures of body coarse and rather close; pubescence whitish; wings fusco-hyaline.
geryon n. sp.
Head transverse, the postero-lateral angles evident, the punctuation distinct; punctures of body not as coarse or close as in *geryon;* wings subhyaline.....2.

2. Postero-lateral angles of head dentate; cheeks sometimes spined.
canadensis Blake.
Postero-lateral angles of head obtuse.....3.

3. Legs comparatively stout; recurrent vein received by second submarginal cell near middle; head rather subquadrate, the punctures rather evenly separated.....**gila** Blake.
Legs slender; recurrent vein almost interstitial with first transverso-cubital vein, or received by second submarginal cell at extreme base; head transverse, the punctures sparser and irregular.....**athamas** n. sp.

2. **Mutilla Toumeyi** Fox.

Sphærophthalma Toumeyi Fox, Ent. News, v. 297, ♀, 1894.

Arizona: Tucson.

3. **Mutilla nephele** n. sp.

♀.—Ferruginous, sparsely clothed with pale hair; flagellum from second joint fuscous; legs dark testaceous; second dorsal segment with two round spots of

silvery pubescence; head quadrate, broader than thorax, with strong even punctures, the postero-lateral angles acute, but hardly dentate; cheeks carinated posteriorly, the carina terminating below in a spine; thorax subquadrate, subtruncate posteriorly, the punctuation stronger than that of head, especially posteriorly, where it is somewhat reticulate; first abdominal segment sessile with second, finely punctured; second dorsal with distinct, even and rather close punctures, the second ventral with larger, sparse punctures. Length 3–4 mm.

Texas: Brownsville, June (Wickham). Two specimens sent to me by T. D. A. Cockerell.

4. **Mutilla canadensis** Blake.

Mutilla (Sphærophthalma) canadensis Blake, Tr. Am. Ent. Soc., iii, 252, ♀, 1871.
Sphærophthalma canadensis Blake, ibid, xiii, 248, ♀, 1886.
Sphærophthalma alveolata Provancher, Le Nat. Can., xxii, 110, ♂.
Photopsis Cressonii Fox, Ent. News, i, 138, ♂ (not *Mutilla Cressonii* Blake).
Pseudomethoca Cressonii Ashmead, Tr. Am. Ent. Soc., xxiii, 182, ♂, 1896.
Mutilla neojerseiensis Dalla Torre, Cat. Hym., viii, 65, ♂, 1897.

Occurs from Canada to Texas. This species is entirely distinct from the *Mutilla canadensis* of Provancher, and from *Photopsis canadensis* of the same author.

5. **Mutilla scævolella** Ckll. and Cas.

Sphærophthalma scævolella Cockerell and Casad, Tr. Am. Ent. Soc., xxii, 198, ♀.

New Mexico: Las Cruces in May. Only the unique type seen.

6. **Mutilla connectens** Cress.

Mutilla connectens Cresson, Proc. Ent. Soc. Phila., iv, 387, ♀, 1865.
Mutilla (Sphærophthalma) connectens Blake, Tr. Am. Ent. Soc., iii, 252, ♀, 1871.
Sphærophthalma connectens Blake, ibid, xiii, 245, ♀, 1886.

Lower California. Another specimen labelled "California."

7. **Mutilla contumax** Cress.

Mutilla contumax Cresson, Proc. Ent. Soc. Phila., iv, 437, ♀, 1865.
Mutilla (Sphærophthalma) contumax Blake, Tr. Am. Ent. Soc, iii, 252, ♀, 1871.
Sphærophthalma contumax Blake, ibid, xiii, 251, ♀, 1886.

Colorado; New Mexico: Santa Fé, July (Cockerell).

8. **Mutilla præclara** Blake.

Sphærophthalma præclara Blake, Tr. Am. Ent. Soc., xiii, 252. ♀, 1886.

Arizona. Another specimen in coll. U. S. Nat'l Museum from Sulphur Springs Valley, Arizona, May 9, collected by Hubbard.

9. **Mutilla donæ-anæ** Ckll. and Fox.

Sphærophthalma donæ-anæ Cockerell and Fox, Pr. Ac. N. S. Phila., 137, ♂, 1897.

New Mexico: Las Cruces (Cockerell).

10. **Mutilla Wickhami** Ckll. and Cas.

Sphærophthalma Wickhami Cockerell and Casad, Tr. Am. Ent. Soc. xxii, 297, ♀, 1897.

Texas: Houston (Wickham). Only the unique type seen. This species differs from the others in this group by the well-developed scutellar scale.

The following three species are known in the male sex only:

11. **Mutilla geryon** n. sp.

♂.—Black throughout, clothed with pale, erect pubescence, except on head above, where it is black; abdominal segments 2-5 thinly fringed with pale hairs at apex; head with strong, confluent punctures, rounded behind, the postero-lateral angles not evident; space between hind ocelli equal to about half that between them and eyes, the latter somewhat reniform; antennæ about as long as the head and that portion of thorax anterior to middle segment; thorax strongly punctured, but not as closely as head; first abdominal segment sessile with second, with strong, separated punctures; second dorsal with the punctures more separated, those of second ventral somewhat stronger; apical segments with finer, though distinct punctures; wings fusco-hyaline, nervures and stigma blackish, the recurrent vein received by second submarginal cell near middle. Length 7 mm.

Missouri: St. Louis, August 28th. One specimen.

12. **Mutilla gila** Blake.

Mutilla (*Sphærophthalma*) *gila* Blake, Tr. Am. Ent. Soc., iii. 250, ♂, 1871.
Sphærophthalma gila Blake, ibid, xiii, 245, ♂, 1886.

Texas. Only the unique type seen.

13. **Mutilla athamas** n. sp.

♂.—Black, shining, clothed with thin pale hairs; legs not as dark as body, more brownish, comparatively slender; head transverse, with strong, widely separated punctures, postero-lateral angles obtuse, space between hind ocelli equal to less than half that between them and eyes; antennæ about as long as head and thorax united; the first joint of flagellum distinctly shorter than second; thorax with strong, separate punctures, those on mesopleuræ closest; middle segment reticulated, the reticulation largest above; first abdominal segment with large sparse punctures, not very broad, sessile with second, the latter with the punctures large, but somewhat closer; wings subhyaline, nervures and stigma testaceous brown, the recurrent vein received by second submarginal cell at base. Length 5 mm.

California: Poway. One specimen.

3. Group *simillima*.

This group agrees with both the preceding in the first and second abdominal segments being sessile, but differs by the female possessing a distinct pygidial area, which is either striated or punctured, and by the large rounded eyes of male; this sex also differs by possessing a third submarginal cell, which, while less distinct than the other cells, yet is easily discernible. Both sexes have a rather robust

form, and like the two preceding groups, the head is large, wider than thorax in the female.

The pygidium is more distinct in the species having it striated (*similima*, etc.). In *harpalyce* and *brazoria* it is not much more distinct than in the species of the preceding group.

FEMALES.

Body with a more or less dense, appressed pubescence; pygidium not striated...2.
Body thinly pubescent, nude in greater part; pygidium striated.....4.

2. Head, thorax and abdomen above with dense fulvous pubescence, both appressed and erect, that on fifth dorsal segment grayish; pubescence of legs black.....**harpalyce** n. sp.
   Upper part of body less densely pubescent, the erect hairs wanting, that of the legs grayish, as well as that segments 3 and following.....3.
3. Extent of red ground color variable, the head, thorax and second dorsal generally of that color, with appressed fulvous pubescence.
   montivaga Cress.
   Only the second dorsal red, with fulvous pubescence; head and thorax deep, black..... ***montivaga** var. (=*brazoria* Blake).
4. Head large, transverse, wider than thorax; pygidium with longitudinal striæ.....5.
   Head about as wide as thorax, subrounded behind; pygidium with diverging striæ (femora reddish; no spots on second dorsal).....**setis** n. sp.
5. Width of thorax anteriorly equalling the length of its dorsal surface; head very large, subquadrate; legs dark brown; second dorsal blackish at base, apex and laterally, medially orange, which color is sometimes divided by a narrow black line, with coarse, round punctures.
   hippodamia n. sp.
   Thorax longer than broad; head transverse; second dorsal not at all blackish, generally with two yellowish spots; punctures confluent: femora sometimes reddish.....**similima** Smith.

MALES.

More or less reddish or yellowish.....2.
Entirely black.....5.

2. Second segment reddish or yellowish; thorax usually entirely black, though sometimes slightly reddish.....3.
   Abdomen entirely black, the segment thickly fringed apically with yellowish pubescence; dorsulum, scutellum and pronotum reddish.
   propinqua Cress.
3. Head, thorax and most of abdomen with black pubescence; second segment reddish.....4.
   Head, thorax and legs with grayish pubescence; abdomen castaneous, second dorsal bright yellow, the apical margin of dorsal segments with golden pubescence.....**flavida** Blake.
4. Form stout; segments 1 and 2 castaneous, the second dorsal yellower, both clothed with fuscous pubescence; femora fringed beneath with long whitish hairs. Length 11-13 mm.....**occola** Blake.

* The most widely separated varieties of *montivaga* are tabulated only.

Form as usual; abdomen, as a rule, entirely reddish, the color rather uniform throughout, segments 1 and 2 with pale glittering pubescence; femora sparsely pubescent. Length 8-10 mm.....**Sanbornii** Cress.

5. Pubescence entirely black; pubescence black.....**anthracicolor** D. T.
Pubescence entirely pale; wings subhyaline.....**segaeon** n. sp.

14. **Mutilla harpalyce** n. sp.

♀.—Black, the head, thorax and abdomen above, except first segment, as far as fifth segment reddish and densely clothed with appressed and erect fulvous pubescence as far as fourth segment; mandibles ferruginous, darker apically; fifth dorsal segment with pale pubescence; sides of thorax, legs and abdomen beneath with sparse black pubescence; ventral segments 2-5 fringed with grayish yellow hairs; head subquadrate, wider than thorax; thorax not much longer than broad, contracted medially, crenulated and subtruncate behind; first and second segments sessile; second ventral shining with large, scattered punctures, which are sparser basally; other ventrals finely and closely punctured; pygidium rugoso-punctate. Length 9-10 mm.

California: Poway and San Diego. Two specimens.

15. **Mutilla montivaga** Cress.

Mutilla montivaga Cresson, Proc. Ent. Soc. Phila., iv, 436, ♀, 1865.
Mutilla (Sphærophthalma) brazoria Blake, Tr. Am. Ent. Soc., iii, 255, ♀, 1871.
Sphærophthalma montivaga Blake, ibid, xiii, 254, ♀, 1886.
Sphærophthalma brazoria Blake, ibid. xiii, 254, ♀, 1886.

Texas; Kansas; Colorado; New Mexico; Arizona. A very variable species, of which *montivaga* and *brazoria* seem to be the extremes.

16. **Mutilla hippodamia** n. sp.

♀.—Ferruginous, clothed, though not densely, with pale hairs; legs brownish; first segment and second dorsal at base, apex and laterally, fuscous, the latter otherwise orange, which color is sometimes divided by a fuscous line; head very large, subquadrate, wider than thorax, coarsely and confluently punctured, buccal carina sharp; antennæ fuscous from fourth joint, the third joint longer than fourth and fifth united; thorax short, subquadrate, its length about equal to its greatest width, acutely dentate anteriorly at sides, rugoso-punctate above, sides crenulated; first segment sessile with second; second dorsal with strong, rounded punctures, becoming much closer anteriorly; second ventral with coarser, sparser punctures; other segments compactly punctured, especially the dorsals; pygidium rugoso-punctate; all the segments fringed with silvery pubescence.

Alabama; Louisana; Texas.

17. **Mutilla simillima** Sm.

Mutilla simillima Smith, Cat. Hym. Brit. Mus., iii, 62, ♀, 1855.
Sphærophthalma simillima Blake, Tr. Am. Ent. Soc., xiii, 254, ♀. 1886.

Florida. I have also collected this species in Southern New Jersey.

Three specimens before me from Florida are much larger than the typical form, and the orange color of second dorsal segment is

confined to two rather evenly rounded spots. Otherwise they do not seem to differ.

18. **Mutilla sectis** n. sp.

♀.—Ferruginous, tips of mandibles, antennæ from third joint, legs, except greater part of femora, apex of first and second dorsal segments, blackish; pubescence of head and thorax sparse and black, on legs pale; all the abdominal segments fringed with pale pubescence apically, that on first dorsal interrupted medially; head about as wide as thorax, strongly and confluently punctured, the postero-lateral angles slightly evident; first joint of flagellum about as long as following two united; thorax distinctly longer than broad, the punctures of upper surface larger and less confluent than those of head, sides scarcely crenulated; first and second segments sessile, second dorsal with rounded, separated punctures, from which project fine, appressed, golden hairs, which give the segments the appearance of being striato-punctate; second ventral with sparse, shallow punctures; pygidium black, with radiating striæ. Length 10–12.

Florida. Five specimens, one collected by Mrs. A. T Slosson.

19. **Mutilla propinqua** Cress.

Mutilla propinqua Cresson, Proc. Ent. Soc. Phila., iv, 433, ♂, 1865.
Sphærophthalma propinqua Blake, Tr. Am. Ent. Soc, xiii, 242, ♂, 1886.

Texas; Colorado; Montana; New Mexico: Santa Fé (Cockerell); Arizona. Perhaps the male of *montivaga*.

20. **Mutilla oceola** Blake.

Mutilla (Sphærophthalma) oceola Blake, Tr. Am. Ent. Soc., iii, 248, ♂, 1871.
Sphærophthalma oceola Blake, ibid, xiii, 243, ♂, 1886.

Florida; Texas. This is certainly not the ♂ of *dubitata* Smith, as suggested by Blake (Tr. A. E. S., xiii, p. 243) as it is in nowise related; it is probably the male of *hippodamia* described herein.

21. **Mutilla Sanbornii** Blake.

Mutilla (Sphærophthalma) Sanbornii Blake, Tr. Am. Ent. Soc., iii, 248, ♂, 1871.
Sphærophthalma Sanbornii Blake, ibid, xiii, 243, ♂, 1886.

Occurs from Massachusetts to Texas. Supposed to be the male of *simillima*.

22. **Mutilla flavida** Blake.

Mutilla (Sphærophthalma) flavida Blake, Tr. Am. Ent. Soc., iii, 249, ♂, 1871.
Sphærophthalma flavida Blake, ibid, xiii, 244, ♂, 1886.

Texas. Only the unique type seen. *Sphærophthalma volotilis* Cameron, from Mexico, seems to be identical with this species.

23. **Mutilla anthracicolor** D. T.

Sphærophthalma anthracina Fox, Ent. News, iii, 172, ♂, 1892 (Nec *Mutilla anthracina* Gerstaecker).
Mutilla anthracicolor Dalla Torre, Cat. Hym., vii, 9, ♂, 1897.

California: San Diego. Only the unique type seen.

24. **Mutilla segæon** n. sp.

♂.—Black, rather densely clothed with pale, grayish pubescence, the abdominal segments 2-5 fringed with it, the last two segments with black pubescence; head not as wide as thorax, subrounded behind, compactly punctured; first joint of flagellum but little more than half as long as the second; thorax with strong punctures, those of dorsulum being very large and deep; first and second segments sessile, the second dorsal with large, round, separated punctures, the second ventral with large punctures, but not as regular as on second dorsal, remaining segments strongly and closely punctured, the punctures not near as large as on segment 2, however; wings subhyaline, iridescent, nervures and stigma black, third submarginal cell tolerably distinct. Length 6½ mm.

Arizona: Tucson, on *Bigelovia Hartwegi* (Toumey). One specimen in collection of U. S. National Museum.

4. Group *waco*.

This and the following group agree with the preceding groups in the tridentate mandibles, but differ in the small first abdominal segment, which is not sessile with the second, and in shape approaching that of group *occidentalis*. The female head is not enlarged as in the preceding groups, and a distinct pygidium is present. The male, as far as known, has the wings rudimentary as in *M. grandiceps*.

FEMALES.

Black, the second dorsal segment scarlet, segments 3-5 also scarlet sometimes, if not, with black pubescence..... **waco** Blake.

Ferruginous; abdomen from apex of segment 2 black, with silvery pubescence; legs black..... **harmonia** n. sp.

MALE.

Only the male of *waco* is known; it is colored like the female and has rudimentary wings; the second ventral segment has a median carina terminating in a tooth beyond middle.

25. **Mutilla waco** Blake.

Mutilla (*Sphærophthalma*) *waco* Blake, Tr. Am. Ent. Soc., iii, 238, ♀, 1871.
Sphærophthalma waco Blake, ibid, xiii, 229, ♀, 1886

Texas.

26. **Mutilla harmonia** n. sp.

♀.—Ferruginous; antennæ, legs and abdomen from apex of segment, 2 black; head and thorax above with some sparse, golden hairs; second dorsal usually with four yellowish spots, the darker, ferruginous, ground color in the shape of a cross; segments 3 and following with silvery pubescence; a silvery spot at apex of second dorsal medially; thorax pyriform, coarsely punctured above, the sides deeply punctured; first abdominal segment smaller than second, not sessile with it; second dorsal with elongate punctures; second ventral with large separated punctures, subcarinated down middle; pygidium rugose.

Pennsylvania: Philadelphia; New Jersey: Gloucester County; Florida: Jacksonville. Four specimens collected by C. W. Johnson.

5. Group *asopus*.

Differs from group *waco* in the fully-developed wings of male, which sex only is known. The marginal cell is broadly truncate, as in group *occidentalis*, and two distinct submarginal cells with faint traces of a third are present. Second ventral segment with a median carina terminating in a tooth.

MALES.

Head and thorax more or less red, with reddish or fulvous pubescence above...2.
Head and thorax black, with entirely black pubescence (that of segments 3 and following black).....**bexar** Blake.
2. Segments 3 and following with black pubescence.....**asopus** Cress.
Segments 3 and following above with pale fulvous pubescence..**hector** Blake.

27. **Mutilla asopus** Cress.

Mutilla asopus Cresson, Proc. Ent. Soc. Phila., iv, 435, ♀, 1865.
Sphærophthalma asopus Blake, Tr. Am. Ent. Soc., xiii. 225, ♂, 1886

Colorado. Blake suggests that either this species or *hector* is the male of *ægina*, which is not likely, inasmuch as *ægina* belongs to a different section of the genus, having bidentate mandibles.

28. **Mutilla hector** Blake.

Mutilla (*Sphærophthalma*) *hector* Blake, Tr. Am. Ent. Soc., iii, 237, ♂, 1871.
Sphærophthalma hector Blake, ibid, xiii, 225, ♂, 1886.

Kansas. Probably represents a variety of *asopus*.

29. **Mutilla bexar** Blake.

Mutilla (*Sphærophthalma*) *bexar* Blake, Tr. Am. Ent. Soc., iii, 238, ♂, 1871.
Sphærophthalma bexar Blake, ibid, xiii, 229, ♂, 1886.

Texas. These three species (?) may be but forms of one variable species.

6. Group *occidentalis*.

Eyes round or irregularly ovate, smooth, not facetted, entire in both sexes. Mandibles not emarginate, either with a tooth within near apex, or falcate (edentate) in the females. Abdominal segment of female usually narrower at apex than base of second, but is not strongly nodose. Thorax of female varying from pyriform to hexagonal. Tibial spurs of female more or less serrated. Marginal cell truncate, the number of submarginals varying from two to three, usually with three.

The species of this large group represent most of those included by

Blake in the genus *Sphærophthalma*, and may be regarded as typical representatives of that genus. Blake's name *Sphærophthalma* is antedated by *Ephuta* Say by nearly fifty years.

FEMALES.

Thorax elongate or pyriform....2.
Thorax short, hexagonal....31.
2. Thorax and abdomen, or the abdomen alone with dense pubescence, which, in many species, is very long....3.
Insect not densely pubescent, frequently almost nude....17.
3. Pubescence of thorax and abdomen concolorous....4.
Pubescence of thorax and abdomen not concolorous....9.
4. Pubescence of body above very long, white or yellowish....5.
Pubescence short, as a rule fulvous or reddish, in one species whitish....11.
5. Insect entirely clothed with long white pubescence, inclusive of legs....6.
Insect with more or less black pubescence....7.
6. Pygidium not longitudinally striated, ground color red....**gloriosa** Sauss.
Pygidium longitudinally striated, ground color black.
pseudopappus Ckll. (var. of *gloriosa*?).
7. Pubescence of legs entirely black....8.
Femora and tibiæ more or less with pale yellowish pubescence.
magna Cress.
8. Pubescence dirty white, pertaining sometimes to ochraceous.
Sackenii Cress.
Pubescence orange....**Sackenii** Cress., var.
9. Keel of first ventral segment prominently produced anteriorly, size large..10.
Keel of first ventral segment emarginate or bidentate. Length 10 mm.
zelaya Blake.
10. Pubescence of abdomen above varying from fulvous to castaneous; head and thorax with tolerably dense pubescence....**orcus** Cress.
Pubescence of abdomen above pale golden yellow, that of head and thorax sparse, leaving greater portion of those places bare....**leda** Blake.
11. Pubescence fulvous or reddish....12.
Head, thorax above, except a black band medially, two spots on second dorsal, its apex, the third entirely, the fourth and fifth laterally, apex of second ventral, and third and fourth entirely with whitish pubescence, dorsals 4 and 5 with black pubescence medially, ground color red....**Sicheliana** Sauss.
12. Carina of first ventral segment prominently produced anteriorly....13.
Carina of first ventral segment scarcely produced; head and thorax above, second dorsal, except basal third, third and fourth dorsals laterally, and fifth entirely with golden brown pubescence, ground color of abdomen black. Length 10 mm....**clio** Blake.
13. Second dorsal black at base and apex, the fourth and fifth with red or fulvous pubescence, the process of first ventral segment rather acuminate..14.
Second dorsal red, or entirely clothed with red or fulvous pubescence, the fourth and fifth with reddish pubescence, the process of first ventral more or less truncate....15.

14. Pubescence appressed, rather short and silky, usually scarlet, though sometimes paler.....**occidentalis** Linné.
Pubescence erect, tolerably long and coarse, pale fulvous.
comanche Blake.

15. Segment 3 and following entirely black, or the third sometimes with some fulvous pubescence.....16.
Segment 3 and following entirely, or at the sides with pale pubescence, ground color variable, the second dorsal, however, always reddish or fulvous; pubescence of body above varying from pale fulvous to a deeper red.
segina Cress.

16. Ground color castaneous, second dorsal fulvous; head above entirely with reddish pubescence.....**crenata** Cress.
Ground color black, second dorsal fulvous in part or black; head on vertex with reddish pubescence.....**crenata** var. (=*medea* Cr.).

17. First segment almost sessile with the second; head at most scarcely as wide as widest part of thorax, more or less narrowed behind.....18.
First segment rather nodose, rarely otherwise; head large, fully as wide or wider than widest part of thorax, subquadrate, not or scarcely narrowed behind.....27.

18. Second dorsal segment black in greater part.....19.
Second dorsal reddish, as well as greater part of insect.....20.

19. Second dorsal with two or four yellow spots; apical margin of segments fringed with silvery pubescence; legs usually red but varying to black.....4-**guttata** Say.
Second dorsal not maculate, or with a faint trace of spots; abdomen without silvery pubescence, or the ventral segments may be fringed with it; legs black.....4-**guttata** var. (=*electra* Blake).

20. Head rounded behind, not tuberculate.....22.
Head with postero-lateral angles angulate, carinate or tuberculate.....21.

21. Postero-lateral angles of head acutely angulate, the first segment dentate on the sides medially.....**anguliceps** n. sp.
Postero-lateral angles of head bearing a short carina or elongate tubercle; first segment not dentate on the sides medially.....**cypris** Blake.

22. Head and thorax with a dense, hoary pubescence, the entire insect sparsely clothed with erect, pale hair; abdomen entirely red, except apex of second dorsal, which is black.....**caneo** Blake.
Head and thorax scarcely pubescent at most with some erect hairs; apical abdominal segments black entirely or in part.....23.

23. Carina of first ventral segment produced anteriorly into a stout tooth (legs black).....**ferrugata** Fabr.
Carina of first ventral segment emarginate medially, so that it is bidentate.....24.

24. Second dorsal segment coarsely sculptured throughout.....25.
Second dorsal segment punctured, sparsely so between the middle and sides, so that it presents two large, rather smooth areas, which are pale yellow; thorax very coarsely rugose, the head strongly punctured. Length 6 mm.....**rugulosa** n. sp.

25. At most the head and thorax with sparse, golden pubescence; second dorsal not rugosely punctured at base, its apical silvery band entire.....26.

Head, thorax and second dorsal segment clothed with a glittering, appressed, sparse, golden pubescence, the second dorsal rugosely punctured at base, its apical silvery band divided into three parts; head more quadrate than in the allied species, tending somewhat to that of the *texana*, *scævola*, etc., section ..... **sparsa** n. sp.

26. Legs black or piceous; entire insect clothed more or less with an erect, pale pubescence; head with a close, confluent, coarse punctuation. **vesta** Cress.

Legs red; insect with scarcely any erect pubescence, except in certain places; head with a strong, separated punctuation ..... **sappho** n. sp.

27. First segment with the basal productions dentate; punctuation not unusually coarse ..... 28.

First segment with the basal productions lamellar; punctuation unusually coarse, the thorax and second segment deeply pitted; head and thorax black; abdomen castaneous, pertaining to yellowish on second segment ..... **Ulkei** Cress.

28. Postero-lateral angles of head unarmed ..... 29.

Postero-lateral angles of head carinate (reddish; legs black; second dorsal with two pale yellowish spots) ..... **cariniceps** n. sp.

29. Head and thorax black or rufo-piceous, legs darker; second segment red, with appressed, orange pubescence above; apical segments dorsally with long black hairs, and fringed above and beneath, more or less, with pale pubescence ..... **texana** Blake.

Insect ferruginous ..... 30.

30 Coarsely sculptured throughout, sparsely clothed with long, pale hairs; leg-spines very robust, as well as the legs themselves; first segment prominently nodose, with a silvery spot at apex; second segment usually with paler spots ..... **scævola** Blake.

Sculptured as usual, about as in *ferrugata*, *vesta*, etc., scarcely clothed with pale hairs; legs slender, the spines delicate in comparison to *scævola*; first segment more as in *ferrugata*, etc., not maculate; second segment unicolored; dorsals 2 at apex, and 3–5 medially, with a silvery spot. **Bollii** n. sp.

31. Head at most as wide as thorax, usually not as wide ..... 32.

Head wider than thorax ..... 41.

32. Pubescence whitish ..... 33.

Pubescence colored otherwise ..... 34.

33. Pubescence above long and white, beneath and on legs black, ground color black or piceous ..... **clytemnestra** n. sp.

Pubescence of entire body, including that of legs, long and white, ground color reddish ..... **thetis** Blake.

34. Body clothed with a close, appressed, short pubescence, and some much sparser, erect hairs (in one species wanting) ..... 35.

Body clothed with coarse, long and matted, or semi-erect pubescence ..... 38.

35. Pubescence of thorax above and second dorsal segment colored the same .. 36.

Pubescence of head and thorax above grayish white, the thorax anteriorly and posteriorly with a black triangular patch of black pubescence; second dorsal with scarlet pubescence; the erect pubescence of upper portion of insect black, otherwise inclusive of legs, whitish; apical segments, with pale pubescence, except the apex of second dorsal and the third (except at sides of both), which have black pubescence. **Dugesii** Ckll. and Cas.

36. Second dorsal with black pubescence at base and apex in middle.....37.
Second dorsal, as well as entire insect above, covered with a golden orange pubescence, with practically no erect hairs; pubescence of legs and body beneath black.....**californica** var.
37. Second ventral segment with very coarse, scabrous sculpture, ground color black (body clothed throughout with whitish or yellowish white pubescence).....**scabra** Fox.
Second ventral segment with large, sparse, shallow punctures, ground color reddish (pubescence above varying from scarlet, to orange, to yellowish white, beneath it is always whitish).....**heterochroa** Ckll.
38. Ground color reddish; second dorsal almost nude, with large, sparse punctures.....39.
Ground color black.....40.
39. Pubescence of head and thorax dirty white; a black patch on third dorsal, the remaining segments with dirty white pubescence..**phoenix** n. sp.
Pubescence pale yellowish throughout; no black patch on abdomen.
venifica Blake.
40. Pubescence above pale yellow.....**progne** n. sp.
Pubescence above varying from scarlet to fulvous.....**californica** Rads.
41. Pygidium rugose or coriaceous.....42.
Pygidium coarsely striated longitudinally.....43.
42. Pubescence pale yellow or grading into fulvous.....**aureola** Blake.
Pubescence scarlet.....**pacifica** Cress.
43. Head and thorax with black pubescence, that of abdomen above fulvous.
gorgon Blake.
Head, thorax and abdomen above with fulvous pubescence.
gorgon Blake, var.

MALES.

First segment distinctly nodose, the suture between it and segment 2 deep and well marked.....2.
First segment not or scarcely nodose, the suture between it and segment 2 not deep.....27.
2. Carina of first ventral segment produced posteriorly into quite a long tooth..3.
Carina of first ventral segment not unusually produced posteriorly.....7.
3. Head and thorax above and apical half of abdomen with pale pubescence.
Sackenii Cress.
The pubescence otherwise colored.....4.
4. Entirely black, except the apical portion of dorsal segment 2, and the following entirely, which are clothed with long fulvous hairs..**orena** Cress.
Head and thorax above with reddish or fulvous pubescence.....5.
5. First and second transverso-cubital veins coalescing at the top: head and thorax above, and dorsal segments of abdomen from apex of segment 2 to apex, with fiery-red pubescence.....**coccineohirta** Blake.
First and second transverso-cubital veins distinctly separated above.....6.
6. Punctuation of second dorsal segment sparse medially, so that the segment is more or less shiny in that spot, ventrally the segment has rather even, strong punctures; dorsals 3, 6 and 7 with fulvous pubescence.
occidentalis Linné.

Punctuation of second dorsal segment even throughout, ventrally the punctures are not quite so strong or as regular as in *occidentalis*; segments 3 and following usually with fulvous pubescence, although sometimes segments 4 and 5 are almost as in *occidentalis*....**comanche** Blake.

7. Head and thorax above with fulvous pubescence....8.
Head and thorax with the pubescence otherwise colored....12.

8. Second segment entirely black: head and thorax above and abdomen above from apex of segment 2 with fulvous pubescence..**ochracea** Blake.
Second segment more or less fulvous, with two spots usually, which, however, sometimes coalesce....9.

9. Segment 3 above and following, as well as part of second, with fulvous or red pubescence....10.
Segment 3 and following with black pubescence....11.

10. Abdomen, except first and basal half of second segment, reddish-fulvous, this portion of abdomen, as well as head and thorax above with scarlet pubescence; first and second transverso-cubital veins separated above....**testaceiventris** n. sp.
Abdomen black, the second segment above on apical half with two fulvous spots, which, sometimes, coalesce; thorax and abdomen from second segment on with fulvous pubescence....**ursula** Cress.

11. Two distinct submarginal cells, the first and second transverso-cubital veins almost coalescing above; second dorsal segment with two yellowish spots on posterior half; head with very little fulvous pubescence.
bioculata Cress.
Three distinct submarginal cells, the first and second transverso-cubital veins distinctly separated above; second segment entirely red, with two paler spots on dorsal moiety; head above antennæ with fulvous pubescence....**pyrrhus** n. sp.

12. Abdomen above, from apex of segment 2, with fulvous pubescence (that of thorax black)....13.
Abdomen with pubescence otherwise colored....15.

13. Second dorsal segment on apical portion with two large fulvous spots; third submarginal cell absent or nearly so....**chiron** Blake.
Abdomen entirely black, except the pubescence noted....14.

14. First and second transverso-cubital veins distinctly separated above; carina of first segment obtusely angulate; pubescence of abdomen above from base of second segment bright scarlet....**phaon** n. sp.
First and second transverso-cubital veins united above, the submarginal cell almost subpetiolate; carina of first segment bidentate; pubescence of abdomen above from apical half of segment 2 fulvous..**zelaya** Blake.

15. Head and thorax black....17.
Head and thorax more or less red....16.

16. Head and thorax entirely red; hind trochanters, spinose, segment 3 and following black....**creon** Blake.
Head, pronotum and dorsulum black; head and thorax with rather dense, hoary pubescence; hind trochanters unarmed; abdomen entirely red.
eximia Blake.

17. Abdomen entirely, or from (and inclusive of) second segment reddish....23.
Abdomen in greater part black, the second segment reddish, except in one species....18.

18. First abdominal segment, viewed from the side, distinctly nodose.....20.
First abdominal segment shorter and broader, not distinctly nodose.....19.
19. First segment with tolerably strong, even punctures, the punctuation of second dorsal rather subtile; segment 2 above and beneath reddish. Length 15 mm.....**fenestrata** Lep.
First segment with large, coarse punctures, the punctuation of second dorsal strong and separated; second segment red above only. Length 10 mm. **agenor** n. sp.
20. Entirely black; pubescence grayish; wings subfuscous.....**gibbosa** Say.
Abdomen more or less reddish.....21.
21. Second dorsal segment with black pubescence, at least on basal half, pale yellowish on apical portion in one species.....22.
Second dorsal segment with rather long, yellowish pubescence, except at extreme base, entirely reddish or red above only.....**macra** Cress.
22. Punctuation of first dorsal segment unusually coarse and irregular, the pubescence of second black throughout. Length about 9 mm.**canella** Blake.
Punctuation of first segment strong, but rather even and separated, the pubescence of apical portion of second yellowish. Length 12 mm. or over.....**castor** Blake.
23. Head and thorax rather densely clothed with grayish pubescence.....24.
Head and thorax not densely clothed with grayish pubescence.....26.
24. First abdominal segment strongly nodose.....25.
First abdominal segment hardly nodose, shorter and broader (ventrals 2 and 3 fringed with pale pubescence at apex).....**monticola** Cress.
25. First abdominal segment nearly twice as long as broad, very much nodose; segments 3, 4 and 7 with pale pubescence.....**apicalata** Blake.
First abdominal segment shorter and broader, not nearly as nodose; abdomen with long black hairs, except on the apical segment. **obscura** Blake. var.
26. Apical margin of the segments, at least dorsally, with black pubescence, that of segments 1 and 2 grayish, or varying to black....**obscura** Blake.
Apical margin of the segments with pale pubescence, both above and beneath; pubescence of head and thorax mixed gray and black, the latter predominating, that of abdominal segments 1 and 2 black. **Suoworum** Ckll. and Fox.
27. Head as usual, not as wide as thorax.....28.
Head large, fully as wide as thorax; head, thorax and abdomen from apical portion of segment 2 with pale yellow or fulvous brown pubescence. **aureola** Cress.
28. Head, thorax and abdomen above with fulvous or reddish pubescence....29.
Head and thorax with black pubescence above, the abdomen above from apical half of segment 2 with reddish pubescence, the ground color black.....**gorgon** Blake.
29. Abdomen, except pubescence, entirely or in greater part black.....30.
Abdomen, except segment 1, reddish, with pubescence of the same color; carina of first ventral segment prominently produced anteriorly..**Foxi** Ckll.
30. Pubescence of head, thorax and abdomen above, from apical half of second segment, fulvous; the ground color beneath this pubescence apparently black.....**fulvohirta** Cress.
Pubescence of head, thorax and abdomen above, from apical half of second segment, carmine; the ground color beneath this pubescence reddish. **Townsendi** Ckll.

30. **Mutilla gloriosa** Sauss.

Mutilla gloriosa Saussure, Ann. Soc. Ent. France, vii, 359, pl. 8, fig. 9, ♀, 1867.
Mutilla tecta Cresson, Tr. Am. Ent. Soc., v, 119, ♀, 1875.
Sphærophthalma tecta Blake, ibid, xiii, 216, ♀, 1886.
Sphærophthalma gloriosa Cameron, Biol. Centr. Amer. Hym., ii, 359, 1894.

California and Lower California. Cresson's *Mutilla tecta* is apparently based on an alcoholic specimen of *gloriosa*, which, in fact of the immersion of the specimen, has the pubescence discolored. The ground color of the type specimen of *tecta* is not fuscous as described, but ferruginous.

31. **Mutilla pseudopappus** Ckll.

Sphærophthalma gloriosa Saussure, var. *pseudopappus* Cockerell, Psyche, vii, Suppl., p. 6, 1895, ♀.

New Mexico: Las Cruces (September); Arizona. I am inclined to regard this dark-bodied form as specifically distinct from the red-bodied *gloriosa;* the latter seems restricted to the coast, whereas *pseudopappus* is an inland species. The sculpture of the pygidium also differs in the two species.

32. **Mutilla magna** Cress.

Mutilla magna Cresson, Proc. Ent. Soc. Phila., iv, 385, ♀, 1865.
Sphærophthalma magna Blake, Tr. Am. Ent. Soc., xiii, 214, ♀, 1886.

Lower California; California eastward to Texas and Kansas. The species is subject to much variation in size.

33. **Mutilla Sackenii** Cress.

Mutilla Sackenii Cresson, Proc. Ent. Soc. Phila., iv, 385, ♀, 1865.
Mutilla erudita Cresson, Tr. Am. Ent. Soc., v, 120, ♀, 1875.
Sphærophthalma Sackenii Blake, ibid, xiii, 213, ♀ ♂, 1886.
Sphærophthalma erudita Blake, ibid, xiii, 217, ♀, 1886.

Arizona; Nevada; California; Lower California. *M. erudita* Cresson is apparently not distinct from *Sackenii*. This is not *gloriosa* Saussure as suggested by Dalla Torre in his catalogue.

34. **Mutilla occidentalis** Linné.

Mutilla occidentalis Linné, Syst. Nat., ed. 10, i, 582, 1758, ♀.
Mutilla bifasciata Swederus, Svenska Vet.-Akad. Handlingar, viii, 285, ♂, 1787.
Mutilla coccinea Fabricius, Ent. Syst., ii, 366, 1793.
Sphærophthalma occidentalis Blake, l. c., 223, ♀ ♂, 1886.

Occurs from New Jersey to Florida. It varies considerably in size, females measuring from 16–27 mm.

35. **Mutilla comanche** Blake.

Mutilla (*Sphærophthalma*) *comanche* Blake, l. c., iii, 234, ♀ ♂, 1871.
Mutilla clotho Blake, ibid, iv, 72, ♀, 1872.
Sphærophthalma comanche Blake, ibid, xiii, 211, ♀ ♂, 1886.
Sphærophthalma clotho Blake, ibid, xiii, 212, ♀, 1886.

Florida; Texas; Colorado; Kansas. I am inclined to regard this as a variety or western race of *occidentalis*

36. **Mutilla orcus** Cress.
Mutilla orcus Cresson, Proc. Ent. Soc. Phila., iv, 428, ♀ ♂, 1865.
Sphærophthalma orcus Blake, l. c., xiii, 209, ♀ ♂, 1886.

Texas westward to New Mexico and Arizona; Mexico: Chihuahua and Lower California.

37. **Mutilla leda** Blake.
Mutilla leda Blake, Tr. Am. Ent. Soc., iv, 72, ♀, 1872.
Sphærophthalma leda Blake, ibid, xiii, 216, ♀. 1886.

Texas. The shape of the thorax does not seem to be at all constant in this species, approaching in some specimens very close to the hexagonal form of the next section.

38. **Mutilla creusa** Cress.
Mutilla creusa Cresson, Proc. Ent. Soc. Phila., iv, 431, ♀, 1865.
Mutilla medea Cresson, ibid, iv, 432, ♀, 1865.
Mutilla bellona Cresson, ibid, iv, 434, ♀, 1865.
Sphærophthalma bellona Blake, Tr. Am. Ent. Soc., xiii, 221, ♀, 1886.
Sphærophthalma creusa Blake, ibid xiii, 223, ♀, 1886.
Sphærophthalma medea Blake, ibid, xiii, 224, ♀, 1886.

Colorado; Texas: Dallas (Boll). Both *medea* and *bellona* are identical, except as to minor color differences, with *creusa;* a series will show the intergradation.

39. **Mutilla ægina** Cress.
Mutilla ægina Proc. Ent. Soc. Phila., iv. 435, ♀, 1865.
Sphærophthalma ægina Blake, Tr. Am. Ent. Soc., xiii, 221, ♀, 1886.

Occurs from Kansas: Wallace Co, 3000 feet (Snow) to Arizona. Some specimens have the pubescence pale ochraceous.

40. **Mutilla clio** Blake.
Mutilla clio Blake, Tr. Am. Ent. Soc., vii, 251, ♀, 1879.
Sphærophthalma clio Blake, ibid, xiii, 214, ♀, 1886.

Vancouver. Only the unique type seen.

41. **Mutilla Sicheliana** Sauss.
Mutilli Sicheliana Saussure, Ann. Soc. Ent. France, 4e. Ser. vii, 360, pl. 8. f. 10, ♀, 1867.
Sphæropothalma Sicheliana Blake, Tr. Am. Ent. Soc., xiii. 217, ♀, 1886.

Mexico (Saussure); Arizona.

The following nine species have the body sparsely pubescent, and, as a rule, reddish; the head is narrower than thorax:

42. **Mutilla quadriguttata** Say.

? Mutilla vagans Fabricius, Ent. Syst. Suppl., 282, ♀, 1798.
Mutilla quadriguttata Say, West. Quart. Reporter, ii, 74, ♀, 1823.
Mutilla electra Blake, Tr. Am. Ent. Soc., iv, 75, ♀. 1872.
Sphærophthalma quadriguttata Blake, ibid, xiii, 239, ♀, 1886.
Sphærophthalma electra Blake, ibid, xiii, 248, ♀, 1886.
Sphærophthalma quadrigutta var. *biguttata* Cockerell, Ent. New, vi, 63, ♀, 1895.

Texas; Kansas. The legs vary from red to black, and the abdomen has or has not the segments fringed with silvery pubescence. The second dorsal may have four, two or no pale spots, or these may be so indistinct as to be scarcely discernible. The series before me shows the intergradation very nicely.

The var. *biguttata* may be *vagans* Fabricius.

43. **Mutilla ferrugata** Fabr.

Mutilla ferrugata Fabricius, Syst. Piez., 438, ♀, 1804.
Sphærophthalma ferrugata Blake, Tr. Am. Ent. Soc., xiii, 239, ♀, 1886.

Massachusetts; Pennsylvania; Illinois; Wisconsin. This species, although well marked in the shape of ventral carina of first segment, has been confused in collections with several species having a superficial resemblance, *i. e.*, the color of the body. For instance, no less than four species were found under *ferrugata* in the collection of the Am. Entom. Society.

44. **Mutilla vesta** Cress.

Mutilla vesta Cresson, Proc. Ent. Soc. Phila., iv, 436, ♀. 1865.
Sphærophthalma vesta Blake, Tr. Am. Ent. Soc., xiii, 240, ♀. 1886.

This species inhabits the region west and northwest of Texas and Kansas, as far as British Columbia. Specimens from the Eastern States differ only in being less pubescent. *M. macra* (= *hispida*) is perhaps the male of *vesta*.

45. **Mutilla sappho** n. sp.

♀.—Ferruginous, including legs, except tarsi, which are fuscous; second segment with or without two pale spots; head narrower than thorax, with distinct separated punctures, postero-lateral angles rounded; first joint of flagellum distinctly shorter than two following united; thorax elongate, pyriform, reticulated above; carina of first ventral segment somewhat emarginate medially so that it presents a bidentate appearance; second dorsal with elongate punctures, having the appearance of being striato-punctate, the second ventral with deeper, stronger punctures; segments 2–6 fringed with pale pubescence; pygidium black, coarsely striated longitudinally. Length 7–12 mm.

Georgia; Florida: Capron, in March, Lake Worth (Mrs. Slosson). Eleven specimens. In the red legs and apical segments this species may be at once distinguished from *ferrugata*, under which name it will, no doubt, be found in many collections.

46. **Mutilla rugulosa** n. sp.

♀.—Ferruginous, clothed with a sparse, erect, pale pubescence, the apical segment with dense, silvery pubescence; legs brownish; abdomen from apex of second segment black, the latter above with two pale yellow spots; head with confluent punctures, the postero-lateral angles obtuse; first joint of flagellum not as long as two following united; thorax rugose, especially posteriorly; scutellar scale rather prominent; carina of first segment indistinctly bidentate; second dorsal striato-punctate, but sparsely punctured on the space occupied by the yellow spots; pygidium strongly striated longitudinally. Length 6 mm.

Three specimens. Not rare in Southern New Jersey in September.

47. **Mutilla cypris** Blake.

Mutilla (Sphærophthalma) cypris Blake, Tr. Am. Ent. Soc., iii, 246, ♀, 1871.
Mutilla (Sphærophthalma) mutata Blake, ibid, 247, ♀, 1871.
Sphærophthalma cypris Blake, ibid, xiii, 239, ♀, 1886.
Sphærophthalma mutata Blake, ibid, 241, ♀, 1886.

Occurs from New Jersey (August) to Florida; also in Illinois: Algonquin (Nason), and Colorado. The maculation of second dorsal is subject to variation, and the size varies from 6-14 mm. The postero lateral angles of the head are always tuberculate, or with a short carina, by which character the species may be at once distinguished.

48. **Mutilla anguliceps** n. sp.

♀.—Ferruginous, with sparse, pale, erect hairs; abdomen from apex of segment 2 black, this segment above with two pale spots; first three joints of antennæ red, remainder blackish; tarsi fuscous; head seen from front triangular, squarely cut off behind, the postero-lateral angles acutely produced, punctuation strong and distinct; thorax ovato-pyriform, contracted behind from middle; first abdominal segment with a small tooth medially at sides, the ventral carina bidentate; second segment with elongate punctures; pygidium longitudinally striated. Length 8 mm.

Illinois: Algonquin (Nason), July 19th. One specimen. Quite distinct by shape of head.

49. **Mutilla caneo** Blake.

Mutilla caneo Blake. Tr. Am. Ent. Soc., vii, 250, ♀, 1879.
Mutilla mixtura Blake, ibid, 251, ♀, 1879.
Sphærophthalma mixtura Blake, ibid, xiii, 234, ♀, 1886.
Sphærophthalma caneo Blake, ibid, xiii, 241, ♀, 1886.

Texas; Colorado; New Mexico: Las Cruces, September 16th (Cockerell). I can see no differences between *caneo* and *mixtura*, except as to the quantity of pubescence on thorax, which is variable.

50. **Mutilla sparsa** n. sp.

♀.—Ferruginous, clothed with a sparse, erect pubescence, and in addition, the head, thorax and second dorsal above is covered with a thin, appressed, golden pubescence; base and apex of second dorsal and the remaining segments blackish;

apical margins of the segments with silvery pubescence, that on second dorsal broken into three spots, that on dorsals 3–5 spreading over the entire segments medially; head subquadrate, about as wide as thorax, coarsely and confluently punctured; postero-lateral angles rounded; first joint of flagellum about as long as two following united; thorax pyriform, covered above with large punctures; first segment with large punctures, the carina bidentate; second dorsal segment with elongate punctures, those at base coarser and rounder; pygidium longitudinally striated. Length 11 mm.

Colorado. One specimen. This species combines the characteristics of the preceding species, 4-*guttata* to *caneo*, and the following five species. The head is intermediate in size between the two aggregations of species mentioned, and in the pyriform thorax it agrees with *scævola*, etc.

The following five species have the head wider than thorax, the latter more exactly pyriform, and the first segment is more nodose than in *ferrugata* and its allies.

51. **Mutilla Ulkei** Cress.

Mutilla Ulkei Cresson, Proc. Ent. Soc. Phila., iv, 387, ♀, 1865.
Sphærophthalma Ulkei Blake, Tr. Am. Ent. Soc., xiii, 238, ♀, 1886.

Lower California: Cape San Lucas. This is a remarkable species and not closely related to any other boreal American *Mutilla*.

52. **Mutilla texana** Blake.

Mutilla texana Blake, Tr. Am. Ent. Soc., vii, 250, ♀, 1879.
Sphærophthalma texana Blake, ibid, xiii, 212, ♀, 1886.

Texas.

53. **Mutilla scævola** Blake.

Mutilla (*Sphærophthalma*) *scævola* Blake, Tr. Am. Ent. Soc., iii, 247, ♀, 1871.
Sphærophthalma scævola Blake, ibid, xiii, 241, ♀, 1886.

Texas: Fedor, September (Birkmann); Colorado; Kansas: Wallace County, 3000 feet (F. H. Snow).

54. **Mutilla cariniceps** n. sp.

♀.—Ferruginous, sparsely clothed with pale, erect hairs; second dorsal with two pale spots, fuscous or black at base and apex, dorsals 4 and 5 covered with silvery pubescence, segments 3 and following black, second and third ventrals fringed with silvery pubescence; legs blackish or brown; head subquadrate, wider than thorax, strongly and closely punctured, the postero-lateral angles bearing a short carina running inwardly; thorax pyriform, rugosely punctured, tending to reticulate posteriorly; carina of first ventral segment entire, truncate; second dorsal with elongate punctures, the second ventral with the punctures tolerably strong and widely separated; pygidium longitudinally striated. Length 10 mm.

Massachusetts; New Jersey; Pennsylvania. This species will be found in several collections under *scævola;* the latter has not, as yet, been found in the Eastern States.

55. **Mutilla Bollii** n. sp.

♀.—Ferruginous; abdomen from apex of second segment black; legs rufopiceous: dorsals 3-6 medially and at sides with silvery pubescence, a spot at apex of dorsal segment 2 in the middle and ventrals 2-4 with a fringe, of similar pubescence; head subquadrate, wider than thorax, covered with strong, close punctures, postero-lateral angles rounded, unarmed; thorax broadly pyriform, tending somewhat to hexagonal, coarsely punctured and distinctly; ventral carina of first segment subemarginate; second dorsal coarsely and closely punctured, unicolorous, except apex; second ventral with large, separated punctures; pygidium coriaceous, with some punctures and striæ. Length 12 mm.

Texas: Dallas (Boll). One specimen. In the five preceding species we have the connecting links between the elongated thorax species and those in which the thorax is hexagonal. In *Bollii* the thorax is less pyriform than in *scævola* or *cariniceps* and tends to hexagonal, and the sculpture of the pygidium is more like that of the aggregation of species with hexagonal thorax.

The following twenty-two species are known in the male sex only, and while it is certain that they belong to the *occidentalis* group, they cannot be placed systematically with any degree of certainty:

56. **Mutilla coccineohirta** Blake.

Mutilla (*Sphærophthalma*) *coccineohirta* Blake, l. c., iii, 235, ♂, 1871.
Sphærophthalma coccineohirta Blake, ibid, xiii, 221, ♂, 1886.

California. That which Blake has described, rather vaguely, as the female of this species seems to be *californicus* Rads., and belongs to another section of the group.

57. **Mutilla testaceiventris** n. sp.

♂.—Black, slightly inclining to piceous in places; head and thorax as far as middle segment and abdomen above from middle of segment 2 with long scarlet pubescence; dorsals, from middle of segment 2, with reddish ground color; ventrals 3-7 testaceous, with reddish pubescence; pubescence of remainder of body black; reticulation of middle segment rather large and distinct; carina of first segment strongly angulate medially, the segment tolerably nodose; wings fuscous, third submarginal indistinct, first and second transverso-cubital veins distinctly separated above. Length 8½ mm.

California: Poway. Distinct from *coccineohirta* in the shape of ventral carina of segment 1 (dentate in *coccineohirta*), ground color of abdomen from segment 2 and shape second submarginal cell.

58. **Mutilla ursula** Cress.

Mutilla ursula Cresson, Tr. Am. Ent. Soc., v, 120, ♂, 1875.
Sphærophthalma ursula Blake, ibid. xiii, 218, ♂, 1886.

Texas; Colorado; New Mexico; Arizona; Utah. A specimen,

rather undersized, from British Columbia, sent by Mr. W. H. Harrington, has the fulvous pubescence of thorax thinned to such an extent that the fulvous color is barely visible to the naked eye.

59. **Mutilla ochracea** Blake.

Mutilla ochracea Blake, Tr. Am. Ent. Soc., vii, 247, ♂, 1879.

Sphærophthalma ochracea Blake, ibid, xiii, 228, ♂, 1886 (not ♀; see *M. progne*).

Kansas; Colorado; Nevada; California. That which Blake has described as the female of *ochracea* is not related to the male; it belongs in another section of the genus.

60. **Mutilla bioculata** Cress.

Mutilla bioculata Cresson, Proc. Ent. Soc. Phila., iv, 431, ♂. 1865.

Mutilla bioculata Cresson, Wheeler's Surv. W. 100th Mer., Zool., 709. ♀, 1875.

Sphærophthalma bioculata Blake, l. c., xiii, 224, ♂, 1886.

Texas; Colorado; South Dakota: Pierre. Cresson has described the female of this species which sex I have not seen. It is said to have the head and thorax above and second dorsal segment with long yellowish-ferruginous pubescence, otherwise with black pubescence. Is 7 lines (14 mm.) in length, and was found in Nevada. It may be the same as *creusa*.

This is a variable species as to size, ranging from 12–25 mm. in length.

61. **Mutilla pyrrhus** n. sp.

♂.—Black, segment 2 above and beneath ferruginous, the second dorsal with two large, paler spots; head and thorax above as far as middle segment with fulvous pubescence, that on the apical half of second dorsal segment short and yellower, otherwise the pubescence is black throughout the insect; reticulation of middle segment coarse and irregular; first segment tolerably nodose, with large separated punctures, the ventral carina somewhat produced at both ends so that it is bidentate; wings fuscous, with three distinct submarginal cells, the second nearly as long as the first and widely separated above. Length 14 mm.

Florida: Enterprise, May 11th. One specimen. In the color of segment 2, this species has a superficial resemblance to *castor* and *fenestrata*.

62. **Mutilla phaon** n. sp.

♂.—Black, with black pubescence, except on abdomen from, and inclusive of, second dorsal to apex, ventrals 3-6 laterally with long, bright scarlet pubescence; first segment tolerably nodose, with coarse, confluent punctures, the ventral carina in the form of a blunt angle; punctures of second ventral segment sparse medially; wings fuscous, third submarginal indistinct, the second smaller, though nearly as long as first; first and second transverso-cubital veins separated above by a distance less than that between the base of second submarginal cell and recurrent vein. Length 13 mm.

Arizona. One specimen.

63. **Mutilla chiron** Blake.
Mutilla chiron Blake, Tr. Am. Ent. Soc, iv, 72. ♂, 1872.
Sphærophthalma chiron Blake, ibid, xiii, 220, ♂, 1886.

Texas. It is doubtful if the specimens I have referred to *chiron* really represent that species. These I am inclined to regard as a variety of *ursula*, having the thoracic pubescence black. They agree with Blake's description of *chiron*, except that no mention is made of the pale maculation of dorsal segment 2, and the third submarginal is much less distinct than one would imagine that of *chiron*, judging from the description. The latter might also be applied to the ♂ *zelaya*. Unfortunately the types of *chiron* seem to be absent from the material on which Blake's work is based.

64. **Mutilla zelaya** Blake.
Mutilla zelaya Blake, ibid, iii, 234, ♂, 1871.
Sphærophthalma zelaya Blake, ibid, xiii, 211, ♂, 1886.

Texas; New Mexico: Albuquerque, August (Snow). The ♀ may be described as follows:—Black throughout, with black pubescence, except on dorsals 2–5, which have long fulvous pubescence extending a little onto the ventral segments; head with strong punctures; thorax elongate, broadest anteriorly, scarcely pyriform, above coarsely reticulate, more distinctly posteriorly; first segment above coarsely pitted, the ventral carina strongly bidendate in consequence of a deep mesial emargination. Length 10 mm.

65. **Mutilla castor** Blake.
Mutilla (Sphærophthalma) castor Blake, ibid, iii, 237, ♂, 1871.
Sphærophthalma castor Blake, ibid, xiii, 227, ♂, 1886.

Occurs from Illinois to Texas and Oklahoma Territory. Also in Florida. The color of the first two segments varies from entirely red with paler spots on segment 2 to black, except the pale spots mentioned. This species will, no doubt, be found under the name *fenestrata* Lep. in some collections.

66. **Mutilla Lepeletierii** Fox (n. n. for *fenestrata* Lep. non Klug).
Mutilla fenestrata Lepeletier, de St. Fargeau, Hym., iii, 627, ♂, 1845.
Mutilla (Sphærophthalma) fenestrata Blake, l. c., iii, 238, ♂, 1871.
Sphærophthalma fenestrata Blake, ibid, xiii, 228, ♂, 1886.

Pennsylvania (St. Fargeau); New Jersey: Ocean County (J. B. Smith). It is somewhat difficult to decide from St. Fargeau's description whether Blake's *castor* or the specimens before me are *fenestrata*. Fargeau does not mention paler spots on second seg-

ment, which leads me to believe that I have judged correctly in placing the specimens before me as *fenestrata*, inasmuch as some specimens have no trace of pale spots on segment 2.

67. **Mutilla agenor** n. sp.

♂.—Black, with black pubescence; second dorsal segment with a transverse, broad, reddish yellow fascia, not extending on base or apex; this light-colored portion of the segment with yellowish pubescence; second ventral entirely black; antennæ about as long as head and thorax; first dorsal segment less nodose than in *castor*, rather broad, convex, with large, coarse punctures, the ventral carina a little prominent posteriorly; second dorsal with distinct separated punctures, the second ventral with much larger punctures; wings fuscous, third submarginal cell indistinct, the first and second transverso-cubital veins separated above. Length 10 mm.

Illinois: Algonquin, August 14th (Nason); British Columbia. Two specimens. This is a smaller and comparatively stouter insect than *Lepeletierii*.

68. **Mutilla macra** Cress.

Mutilla macra Cresson, Proc. Ent. Soc. Phila., iv, 429, ♂, 1865.
Sphærophthalma hispida Blake, Tr. Am. Ent. Soc., xiii, 226. ♂, 1886.
Sphærophthalma macra Blake, ibid, 230, ♂, 1886.

New Jersey; Delaware; Illinois: Algonquin, July and August (Nason); Colorado; Montana. Blake's *hispida* and *macra* are inseparable.

69. **Mutilla admetus** Blake.

Mutilla admetus Blake, Tr. Am. Ent. Soc, iv, 74, ♂, 1872.
Sphærophthalma admetis Blake, ibid, xiii, 229, ♂, 1886.

Texas; Colorado; Montana. Varies from 7–13 mm. in length.

70. **Mutilla obscura** Blake.

Mutilla (*Sphæroph.*) *obscura* Blake, Tr. Am. Ent. Soc., iii, 239. ♂, 1871.
Sphærophthalma obscura Blake, ibid, xiii, 231, ♂, 1886.
Sphærophthalma macer (*macerata*) Blake, ibid, 237, 286, ♂, 1886.
Sphærophthalma macera Dalle Torre, Catal, viii, 56, 1897.

Massachusetts (Blake); North Carolina; Texas; Colorado. *M. macer*, which name was subsequently changed to *macerata* by its author, is identical with *obscura*. The size is variable fully as much as in *admetis*. The specimens of *macer* mentioned by Blake as having the pubescence entirely black are referable to *admetus*.

71. **Mutilla apicalata** Blake.

Mutilla (*Sphæroph.*) *apicalata* Blake, Tr. Am. Ent. Soc., iii, 238, ♂, 1871.
Sphærophthalma apicalata Blake, ibid, xiii, 230, ♂, 1887.

Mexico; Texas.

72. **Mutilla creon** Blake.
Mutilla creon Blake, Tr. Am. Ent. Soc., iv, 73, ♂, 1872.
Sphærophthalma creon Blake, ibid, xiii, 228, ♂, 1886.

Texas.

73. **Mutilla eximia** Blake.
Mutilla eximia Blake, Tr. Am. Ent. Soc., xiii, 200, ♂, 1886.

Arizona. This is a typical *Sphærophthalma*, but was described by Blake as a true *Mutilla*.

74. **Mutilla Snoworum** Ckll. and Fox.
Sphærophthalma Snoworum Cockerell and Fox, Proc. Acad. Nat. Sci. Phila., 135 ♂, 1897.

New Mexico: Albuquerque (Snow).

75. **Mutilla canella** Blake.
Mutilla (Sphæroph.) canella Blake, Tr. Am. Ent. Soc., iii, 239, ♂, 1871.
Sphærophthalma canella Blake, ibid, xiii, 230, ♂, 1886.

Texas; New Jersey: Gloucester County, August 16th.

76. **Mutilla gibbosa** Say.
Mutilla gibbosa Say, Bost. Journ. Nat. Hist., i. 298, ♂, 1836.
Sphærophthalma gibbosa Blake, Tr. Am. Ent. Soc., xiii, 231, ♂, 1886.

Occurs from Massachusetts to Texas and Illinois; Mexico.

77. **Mutilla monticola** Cress.
Mutilla monticola Cresson, Proc. Ent. Soc. Phila., iv, 430, ♂, 1865.
Sphærophthalma monticola Blake, Tr. Am. Ent. Soc., xiii, 226, ♂, 1886.

Colorado. The first segment in this species is scarcely as nodose as in the preceding species, and approaches the form of that of *fulvohirta, townsendi*, etc.

The next series of species has the head at most as wide as thorax.

78. **Mutilla clytemnestra** n. sp.

♀.—Black, the head, thorax and abdomen above with long white hairs similar to that of *gloriosa*, etc.; pubescence of legs and first dorsal black; head as wide as thorax; thorax posteriorly with large, coarse punctures; ventral carina of first segment dentate or angulate medially; second ventral segment rugosely punctured, scabrous; pygidium finely rugose. Length 8 mm.

California: Poway. Three specimens. Differs from *thetis* by larger size, black body and black pubescence of legs.

79. **Mutilla thetis** Blake.
Sphærophthalma thetis Blake, Tr. Am. Ent. Soc., xiii, 214, ♀, 1886.

Arizona. Only the unique type seen.

80. **Mutilla heterochroa** Ckll. and Cas.
Sphærophthalma heterochroa Cockerell and Casad, Ent. News, v, 298, ♀, 1894.

New Mexico: Mesilla and Las Cruces in August and September

(Cockerell); Arizona: Phœnix (H. G. Griffith); California: Riverside (Wickham). The latter specimen is the larger and has the pubescence of upper part of body quite pale in comparison to typical examples.

Mr. Cockerell has suggested the possibility of *S. Foxii* being the male of *heterochroa*.

81. **Mutilla phœnix** n. sp.

♀.—Ferruginous, sides of thorax fuscous; head and thorax above with coarse, dense, dirty-white pubescence, that on thorax posteriorly sparse and black; legs with pale pubescence; second segment apically, and the remaining segments with coarse, dirty-white pubescence; a patch of black hair on third dorsal; head about as wide as thorax, the latter hexagonal, with coarse reticulations on upper part of posterior surface; second dorsal with large, separated punctures, nude, except for the hair on apex; punctures of second ventral sparse, but much feebler than those of the dorsal surface; pygidium black, rugose. Length 7 mm.

Arizona: Phœnix (H. G. Griffith). Two specimens.

82. **Mutilla scabra** Fox.

Sphærophthalma scaber Fox, Proc. Cal. Acad. (2), iv, 94, ♀, 1894.
Mutilla scabra Dalla Torre, Catal. Hym., viii, 84, ♀, 1897.

Lower California.

83. **Mutilla Dugesii** Ckll. and Cas.

Sphærophthalma Dugesii Cockerell and Casad, Ent. News, v, 294. ♀.

Mexico: Guanajuato (Ckll. and Cas.); Texas: Big Springs (Wickham).

84. **Mutilla progne** n. sp.

Sphærophthalma ocracea Blake, Tr. Am. Ent. Soc., xiii, 228, ♀ (non ♂), 1886.

♀.—Black, head, thorax and abdomen above with tolerably long, shaggy, ochraceous pubescence; other pubescence black; head about as wide as thorax, cribrose with coarse punctures; first joint of flagellum about as long as two following united; thorax hexagonal, coarsely punctured; ventral carina of first segment prominently arched medially; second ventral with large, scattered punctures, with a small prominence medially near the base; pygidium finely rugose. Length 9-12 mm.

Occurs from New Mexico to California. This species has been described as the female of *ochracea*, which I do not believe it to be.

85. **Mutilla venifica** Blake.

Sphærophthalma venifica Blake, Tr. Am. Ent. Soc., xiii, 210, ♀, 1886.

California: Santa Barbara. Only the unique type seen. The pubescence is quite sparse, the specimen having a rubbed appearance.

86. **Mutilla californica** Rad.
Mutilla californica Radoszkowski, Hor. Soc. Ent. Ross, i, 86, T. ii, f. 7, ♀, 1861.
Sphærophthalma californica Blake, Tr. Am. Ent. Soc., xiii, 219, ♀, 1886.

Kansas; Texas; Colorado; Dakota; Wyoming; New Mexico; Arizona; California; Hudson Bay Territory. Specimens are subject to some variation as to size and color of pubescence. Two from Arizona and Wyoming differ only in having pubescence closer, appressed and not rough and shaggy as in most specimens.

The following two species have the head very large, wider than thorax; the latter is shorter and more truly hexagonal than in *californica*, etc., and on the whole the form is broader; pygidium rugose or coriaceous.

87. **Mutilla pacifica** Cress.
Mutilla pacifica Cresson, Tr. Am. Ent. Soc., v, 120, ♀, 1875.
Sphærophthalma pacifica Blake, ibid, xiii, 217, ♀, 1886.

Colorado and California; Lower California. Varies considerably in size.

88. **Mutilla aureola** Cress.
Mutilla aureola Cresson, Proc. Ent. Soc. Phila., iv, 386, ♀, 1865.
Sphærophthalma parmosa Blake, Tr. Am. Soc., xiii, 210, ♀, 1886.
Sphærophthalma aureola Blake, ibid, 215, ♀, 1886.
Sphærophthalma mollissima Blake, ibid, 215, ♂ ♀, 1886.

Nevada; California. Blake's types of *mollissima* were said to have come from Colorado; at present they bear no locality label, and I am inclined to doubt if they came from Colorado. The color of the pubescence varies from pale yellow to a ochraceous.

M. gorgon has the pygidium longitudinally striated, otherwise closely agreeing with *pacifica* and *aureola*.

89. **Mutilla gorgon** Blake.
Mutilla (Sphærophthalma) gorgon Blake, Tr. Am. Ent. Soc., iii, 233, ♀, 1871.
Mutilla tisiphone Blake, ibid, vii, 249, ♀, 1879.
Sphærophthalma gorgon Blake, ibid, xiii, 210, ♀, 1886.
Sphærophthalma tisiphone Blake, ibid.

Texas: Dallas (Boll); Arizona; New Mexico: Mesilla, June 11th (Cockerell): Albuquerque in August (Snow). Blake's *tisiphone* is apparently a rubbed specimen with paler pubescence. Specimens vary from 11–17 mm. in size. One Texan example, a female, has the reddish hairs covering the upper part of head and thorax as well as abdomen. The ♂ may be described as follows:

♂.—Black, with black pubescence, except on abdomen above from middle of second segment, and on ventrals 3 and following at sides, where it is reddish; head with distinct punctures, much narrower than thorax; punctures of dorsulum coarser than those of head; middle segment covered with deep, but not very large reticulations; calcaria black; first segment coarsely punctured, not very nodose, the sinus between it and segment 2 not deep, ventral carina acutely angular; second dorsal with punctures much finer and closer than on segment 1, the second ventral with large, scattered punctures; wings fuliginous, second submarginal cell nearly triangular in consequence of the first and second transverso-cubital veins nearly uniting above. Length 14 mm.

Group *pennsylvanica*.

Here we have a group of four species combining the characteristics of *Sphærophthalma* and *Photopsis*. The eyes are irregularly rounded or reniform in male, variable in size, rounded in female. Ocelli variable in size, rounded, small in *scæva* and *pennsylvanica*, more as in groups *imperialis* and *auripilis*. Mandibles heavy and short in male, more or less concave on upper surface, as in groups *imperialis* and *anthophoræ*, presenting above a scooped-out appearance, in the female the mandible is much as in group *occidentalis*, with an internal tooth before apex First segment of female not quite sessile with the second, but more so than in the preceding group, in the males more or loss nodose. Thorax of female elongato-pyriform. Tibial spurs not serrated. Marginal cell of a shape between subtruncate and acuminate, two distinct submarginal cells, the third, if present, quite faint. No trace of a pygidium in female.

It is difficult to draw a line of demarkation between the males of this and the following group. The shape of the ocelli is, as a rule, different in the two, but is hardly sufficiently constant to prove of much importance. The only available character between these groups, on which the separation of the two may be based, is the total absence of a pygidium in the female of group *pennsylvanica*.

This group formed part of Blake's genus *Sphærophthalma*.

MALES.

Greater part of body black, with black pubescence, the second segment only reddish (ocelli small).....**scæva** Blake.

Greater part of body castaneous.....2.

2. Wings fuscous.....3.

Wings subhyaline, darker apically; pubescence of abdomen griseus.
jason n. sp.

3. Abdomen from apex of segment 2 black, with black pubescence; ocelli small.
pennsylvanica Lep.

Abdomen entirely castaneous, clothed with golden pubescence; ocelli rather large.....**auripilis** Blake.

FEMALES.

Entirely ferruginous; first and second segments banded with white pubescene, that of apical segments fuscous.....**balteola** Blake.
Head and thorax ferruginous; abdomen and legs black; first segment not banded. **virguncula** Blake.

90. **Mutilla scæva** Blake.
Mutilla (*Sphærophthalma*) *scæva* Blake, Tr. Am. Ent. Soc., iii, 232, ♂, 1871.
Sphærophthalma scæva Blake, ibid, xiii, 207, ♂, 1886.

Pennsylvania: Philadelphia; Virginia; Texas.

91. **Mutilla pennsylvanica** Lep.
Mutilla pennsylvanica Lepeletier de St. Fargeau, Hym., iii, 628, ♂, 1845.
Sphæropothalma pennsylvanica Blake, Tr. Am. Ent. Soc., xiii, 208, ♂, 1886.

North Carolina; Florida; Texas. Recorded from Pennsylvania by Lep. de St. Fargeau.

92. **Mutilla auripilis** Blake.
Mutilla (*Sphærophthalma*) *auripilis* Blake, Tr. Am. Ent. Soc., iii, 233, ♂.
Sphærophthalma auripilis Radoszkowski, Hor. Soc. Ent. Ross., xix, 32, T. 6, f. 47, 1885; Blake, Tr. Am. Ent. Soc., xiii, 206, ♂, 1886.

Texas; Oklahoma Territory.

93. **Mutilla jason** n. sp.
♂.—Castaneous, clothed throughout with pale pubescence, that on last two segments somewhat darker; legs and flagellum blackish; antennæ about as long as the head and that portion of thorax anterior to middle segment; wings subhyaline, darker apically; two submarginal cells, the third barely discernible; marginal cell acuminate. Length 11 mm.

Texas. One specimen belonging to the U. S. National Museum. Easily separated from its allies by pale wings and pubescence.

94. **Mutilla balteola** Blake.
Mutilla (*Sphærophthalma*) *balteola* Blake, Tr. Am. Ent. Soc., iii, 248, ♀, 1871.
Sphærophthalma balteola Blake, ibid, xiii, 242, ♀, 1886.

Texas; Oklahoma Territory.

95. **Mutilla virguncula** Blake.
Sphærophthalma virguncula Blake, Tr. Am. Ent Soc., xiii, 253, ♀, 1886.

New Mexico. Only the unique type seen.

Group *imperialis* (= *Photopsis* Blake pt.).

In the males the ocelli are large, prominent, more or less reniform, the eyes large, irregularly rounded, tending to subovate, and usually subemarginate anteriorly and posteriorly, finely facetted; in the female subovate, also facetted. Mandibles of male as in group *pennsylvanica*, in the female straight, with a small tooth internally

before apex, altogether much as in group *occidentalis*. First abdominal segment in male more or less nodose, varying in length, with coarser punctures than the second, always considerably narrower; in female it is always smaller than second, not uniting evenly with it. Tibial spurs slender, not serrated. Marginal cell lanceolate or subtruncate; two submarginals, with a very faint trace of a third in some species. Pygidium of female large, finely granulated.

The chief points of difference between the males of this and group *anthophoræ* lie in the sculpture and shape of first abdominal segments. Both sexes of no species have been observed, whereas in group *anthophoræ* the sexes of at least one species have been correlated.

This group is the American representative of the European *Tricholabiodes* Rad., differing in having no trace of a third submarginal cell.

MALES.

First segment seen from the side distinctly nodose.....2.
First segment scarcely nodose, gradually broadened from base to apex (head, thorax and first segment castaneous brown, segments 2 et seq. black; legs and antennæ pallid).....**nigriventris** Fox.
2. Pubescence more or less golden or yellowish.....3.
Pubescence pale or subfuscous.....4.
3. Pubescence on dorsulum and abdominal segments 2 and following yellowish, otherwise pale fuscous; head and legs black; wings more or less fuscous on apical third.....**imperialis** Blake.
Pubescence throughout yellowish; the insect entirely fulvous, sometimes becoming quite dark: wings dark fuscous throughout.
Edwardsii Cress.
4. First segment forming a rather distinct node at apex.....5.
First segment more of a convex, rather than nodose, form at apex, or it may be described as slightly nodose.....10.
5. Abdomen more or less blackish or fuscous.....6.
Abdomen not at all dark.....8.
6. Abdomen from base of segment 2 black; dorsulum not dark.....7.
Abdomen from apex of segment 3, femora, tibiæ and dorsulum blackish; head not dark; antennæ and tarsi testaceous.....**clara** Cress.
7. Legs and antennæ pale testaceous; first segment elongate, rather narrow.
mesillensis Ckll.
Legs and antennæ black; first segment broader.....**bellerophon** n. sp.
8. Wings fuscous in greater part: pubescence subfuscous..**ferruginosa** D. T.
Wings hyaline in greater part.....9.
9. Wings crossed by a fuscous cloud from the stigma, the latter dark. Length 6-9 mm.....**danaus** Blake.
Wings clear, with a yellowish caste; stigma pale. Length 15 mm.
helicaon n. sp.

10. Abdomen castaneous brown, if at all darker the apical (4-7) may be fuscous..11.
Abdomen black from and inclusive of segment 2.....15.
11. Head considerably produced and rapidly narrowed behind, somewhat rhombiform, but rounded at the occiput; first abdominal segment banded with white pubescence at apex, segments 4-7 fuscous.
albicincta n. sp.
Head broadly rounded behind; first segment not banded with white, the apical segments castaneous brown.....12.
12. Insect throughout very pale, especially legs and antennæ, clothed throughout with a long, erect, whitish, rather dense pubescence; stigma pale.
territas Ckll.
Insect castaneous brown; pubescence sparser and darker, though pale; stigma dark.....13.
13. Antennæ much shorter than head and thorax united..**brevicornis** n. sp.
Antennæ as long or nearly as long as head and thorax united.....14.
14. First segment about three times wider at apex that at base, evenly convex, its punctuation separated.....**mellicauda** Blake.
First segment about two times wider at apex than at base, its punctuation confluent.....**orestes** n. sp.
15. First segment about three times wider at apex than at base, its punctuation separated; head concolorous with thorax; legs pale....**pluto** n. sp.
First segment elongate, subpetiolate, barely twice as wide at apex as at base, its punctuation more or less confluent.....16.
16. Head transverse, broadly truncate behind, black; space between hind ocelli much greater than that between them and eyes; antennæ shorter than head and thorax; legs dark.....**nokomis** Blake.
Head considerably produced and rounded behind, concolorous with thorax; space between hind ocelli slightly less than that between them and eyes; antennæ slender, about as long as head and thorax; legs pale.
Hubbardii n. sp.

FEMALES.

Insect above, at least on head and thorax, clothed with a dense pubescence concealing the sculpture.....2.
Insect with a sparser pubescence.....5.
2. Pubescence reddish or golden.....3.
Pubescence of head, thorax and abdomen above from middle of second segment golden yellow; ground color dark, the anterior half of second dorsal segment with long black hairs.....**marpesia** Blake.
3. Abdominal segments 3-6 above and beneath more or less with pale pubescence.4.
Abdominal segments 3-6, as well as the entire upper surface of abdomen, with golden pubescence: ground color reddish, sides of thorax black.
zenobia Blake.
4. Pubescence of thorax above and second dorsal segment coppery red, the long, erect pubescence paler; head covered with an appressed, grayish pubescence, as well as erect hairs; ground color of abdomen reddish, dorsals 3-5 fringed medially with yellowish pubescence....**arota** Cress.
Pubescence of thorax above and second dorsal, except laterally and posteriorly, fulvous; head anteriorly with grayish pubescence, above with fulvous; ground color of abdomen black, the fulvous pubescence of the second

dorsal not completely covering the segment, leaving a black space laterally and posteriorly; segments 2-5 fringed with white pubescence at apex.....**ceres** n. sp.

5. Insect rather densely clothed with a fine, silky, pale pubescence, especially the head and apical segments, that on head and thorax above short, dense and appressed, elsewhere long and paler, on abdomen from apex of segment 2 dense and whiter; second dorsal covered with strong punctures, not coarse as in other species; pygidium finely rugose longitudinally; form rather broad, the thorax subquadrate.**halcyone** n. sp.

Insect less densely pubescent, in some species fairly well clothed, however; second dorsal with very strong punctures, or rugose; pygidium at most finely granulated.....6.

6. Second dorsal segment punctured throughout.....8.

Second dorsal segment coarsely rugose toward the base (insect reddish).....7.

7. Thorax pyriform, rugosely punctured above; second dorsal basally with strong, longitudinal rugæ or folds.....**loadamia** n. sp.

Thorax short, subquadrate, coarsely rugose above; second dorsal basally coarsely sculptured, covered with rough tubercles or projections, apically rugoso-punctate.....**dirce** n. sp.

8. Head entirely and thorax more or less covered with a close, appressed pubescence, the entire body clothed with an erect, whitish pubescence, especially dense on abdomen, basally and apically and sides of thorax...9.

Head and thorax bare or sparsely pubescent.....10.

9. Body pale ferruginous, legs pale; dorsals 3 and 4 with a patch of black-brown pubescence, strongly contrasting with the pale pubescence, with which it is surrounded.....**diomeda** n. sp.

Body dark ferruginous, including legs; apical dorsal segment with sparse, pale pubescence.....**erato** Blake.

10. Second dorsal with elongate, more or less confluent punctures.....11.

Second dorsal with separated punctures (thorax rugose above, truncate behind).....**nanula** D. T.

11. Head with strong, distinct punctures; thorax rugoso-punctate; legs blackish.....**albopilosa** Blake.

Head finely rugose; thorax above rugose; legs red; eyes unusually convex. **myrrha** n. sp.

The six following species have the first segment strongly nodose, much as in the *occidentalis* group:

96. **Mutilla imperialis** Blake.

Agama imperialis Blake, Tr. Am. Ent. Soc., iii, 260, ♂, 1871.
Photopsis imperialis Blake, ibid, xiii, 265, ♂, 1886.

Texas.

97. **Mutilla Edwardsii** Cress.

Mutilla Edwardsii Cresson, Tr. Am. Ent. Soc., v, 119, ♂, 1875.
Sphærophthalma Edwardsii Blake, ibid, xiii, 208, ♂, 1886.

Oregon; Washington; California.

Imperialis and *Edwardsii* have the appearance of the males of

group *occidentalis* (= *Sphærophthalma*); but while the next four species agree with them in shape of first segment, they are more of the type of group *anthophoræ*, which I regard as typical *Photopsis*.

98. **Mutilla clara** Cress.

Mutilla clara Cresson, Proc. Ent. Soc. Phila., iv, 439, ♂, 1865.
Agama clara Blake, Tr. Am. Ent. Soc., iii, 261, ♂, 1871.
Photopsis clara Blake, ibid, xiii, 262, ♂, 1886.

Colorado. Only the unique type seen. The fore wings have a small, pale, fuscous spot near posterior margin medially.

99. **Mutilla danaus** Blake.

Agama danaus Blake, Tr. Am. Ent. Soc., iii, 261, ♂, 1871.
Photopsis danaus Blake, ibid, xiii, 261, ♂, 1886.

Texas. Easily recognized from other species of this group by fasciate wings and strongly nodose first segment.

100. **Mutilla bellerophon** n. sp.

♂.—Head, thorax and first segment castaneous; head sometimes in part, legs and abdomen, from and including segment 2, black; antennæ as long or longer than head and thorax, flagellum fuscous; head with strong, separated punctures, broadly rounded behind; space between hind ocelli distinctly less than that between them and eyes; first abdominal segment distinctly nodose, coarsely punctured, considerably widened apically; second dorsal with scattered punctures, closer basally; dorsals 3-6 finely and closely punctured; second ventral with large, separated, even punctures; wings subhyaline, stigma black, nervures testaceous; entire insect clothed with an erect, pale pubescence. Length 6½ mm.

Arizona; New Mexico: Santa Fé in July (Cockerell). Two specimens.

101. **Mutilla mesillensis** Ckll.

Photopsis mesillensis Cockerell, Entomologist, xxx, 137, ♂.

New Mexico: Mesilla, July 30th. Mr. Cockerell kindly loaned me the type of this species.

102. **Mutilla helicaon** n. sp.

♂.—Entirely pale castaneous; legs and flagellum more testaceous; head with strong, separated punctures, rather well produced and narrowed behind eyes, hind margin subrounded; antennæ shorter than head and thorax; space between hind ocelli, if anything, slightly greater than that between them and eyes; punctures of dorsulum large and separated; first abdominal segment rather short, nodose, coarsely punctured, in length shorter than middle segment; second and following dorsals sparsely punctured, the second ventral more strongly; wings subhyaline, slightly yellowish, nervures and stigma pale, recurrent vein received by second submarginal cell between base and middle; entire insect clothed with an erect, pale pubescence. Length 15 mm.

Nevada. One example.

103. **Mutilla albicincta** n. sp.

♂.—Pale castaneous, abdominal segments 3 and following fuscous; ocellar region black; head considerably narrowed and produced behind eyes, so that when viewed from above it has a somewhat triangular form, punctures not strong, scattered; antennæ nearly as long as head and thorax; space between hind ocelli a little greater than that between them and eyes; mesopleuræ with an irregularly oblique ridge from base of wings downward; first abdominal segment with coarse, scarcely confluent punctures, nodose, but not strongly, being rather more of a strongly convex form at apex, longer and narrower than in *helicaon*, but still not as long as middle segment; punctures of rest of abdomen sparse and not very strong, those on second ventral strongest; wings subhyaline, not yellowish, stigma dark, nervures pale; entire insect clothed with erect, white pubescence, and apex of segments 1-6 with a fringe of white pubescence. Length 11 mm.

Arizona. One example.

104. **Mutilla brevicornis** n. sp.

♂.—Castaneous; apical segments but little, if anything, darker; legs and antennæ testaceous; head with separated punctures, rather square when viewed from above in consequence of not contracting very much behind eyes, posterior margin rather evenly rounded; space between hind ocelli less than that between them and eyes; antennæ short, about equal to length of head and that portion of thorax anterior to middle segment; dorsulum with large, separated punctures; mesopleuræ not ridged; first abdominal segment with large, well-separated punctures, rather broad and strongly convex, rather than nodose at apex; second segment above sparsely, beneath strongly punctured, remaining segments finely and closely; wings subhyaline, nervures pale, stigma darker; entire insect with erect, pale (not white) pubescesce, apex of second or second and third segments with a fringe of white pubescence. Length 11 mm.

Texas; Montana. Has been confused with *melicausa* by writers.

105. **Mutilla melicausa** Blake.

Agama melicausa Blake, Tr. Am. Ent. Soc., iii, 240, ♂, 1871.
Photopsis melicausa Blake, ibid, xiii, 262, ♀, 1886.

Texas.

106. **Mutilla territa** Ckll.

Photopsis territus Cockerell, Ent. News, v. 200. ♂, 1894.

New Mexico: Las Cruces. The head seems to be almost impunctate in this species.

107. **Mutilla pluto** n. sp.

♂.—Head, thorax and first abdominal segment castaneous, remainder of abdomen fuscous or black, with segments margined with testaceous at apex; antennæ and legs paler than thorax; head rather well produced behind eyes, not much contracted, subrounded, punctures strong and separated; space between hind ocelli distinctly less than that between them and eyes; antennæ shorter than head and thorax, its length somewhat greater than the head and that portion of thorax anterior to middle segment; first abdominal segment broad, widened at least three times apically, strongly convex, the punctures confluent basally, distinct toward apex; second segment above shining, sparsely punctured, except

laterally, beneath with strong, scattered punctures; remaining segments finely and closely punctured; wings subhyaline, slightly yellowish, nervures and tigma pale; entire insect clothed with pale pubescence, a whitish fringe at apex of second or second and third segments. Length 11-12 mm.

Texas. Five specimens. This species has been confused with *nokomis*, but is quite distinct by shape of first abdominal segment.

108. **Mutilla nokomis** Blake.

Agama nokomis Blake, Tr. Am. Ent. Soc., iii, 260, ♂, 1871.
Photopsis nokomis Blake, ibid, xiii, 259, ♂, 1886.

Arizona. Only the unique type seen.

109. **Mutilla Hubbardii** n. sp.

♂.—Head, thorax and first abdominal segment castaneous; abdomen black from segment 2; legs and antennæ testaceous, the flagellum and hind legs pertaining to fuscous; pubescence whitish; head considerably produced and rounded behind eyes; space between hind ocelli slightly less, if anything, than that between them and eyes; antennæ about as long as head and thorax united; first abdominal segment elongate, subpetiolate, nodose, but not strongly at apex, its punctures large and somewhat confluent; second dorsal with large, sparse punctures laterally, those of the second ventral larger and more abundant; wings subhyaline, nervures testaceous, stigma dark; second submarginal cell shorter than first, the second transverso-cubital vein straight. Length 8-10 mm.

Arizona: Chiric Mts. and Fort Grant in August (H. G. Hubbard). Two specimens in collection U. S. National Museum.

110. **Mutilla orestes** n. sp.

♂.—Pale castaneous; legs and antennæ paler, clothed with a rather sparse, pale pubescence throughout, the abdominal segments 2-5 with a short, whitish fringe; head subquadrate, considerably produced, but scarcely narrowed behind eyes, almost truncate behind, punctures tolerably strong and separated; space between hind ocelli very slightly less than that between them and eyes; antennæ fully as long as head and thorax united; first abdominal segment rather narrow, not more than twice wider at apex than at base, convex or subnodose at apex; punctures coarse and confluent; second dorsal shining, sparsely punctured, the ventral moiety more distinctly; wings subhyaline, somewhat yellowish, stigma dark, nervures pale. Length 14 mm.

One specimen with no locality label. Inhabits the Southwestern United States, probably.

111. **Mutilla ferruginosa** D. T.

Agama ferruginea Blake (nec Smith), Tr. Am. Ent. Soc., vii, 254. ♂. 1879.
Photopsis ferruginea Blake, ibid, xiii, 264, ♂, 1886.
Mutilla ferruginosa Dalla Torre, Cat. Hym., viii, 40, 1897.

Nevada.

112. **Mutilla nigriventris** Fox.

Photopsis nigriventris Fox, Pr. Cal. Ac. Sci. (2), iv, 5, ♂, 1893.

Lower California. The first segment in this species is only gently

convex, and approaches in shape that of the males of the next group; the segment is strongly punctured, however, and for that reason I have placed the species in group *imperialis*.

The following thirteen species are no doubt the females of some of the species just enumerated under group *imperialis:*

113. **Mutilla arota** Cress.

Mutilla arota Cresson, Tr. Am. Ent. Soc., v, 120, ♀, 1875.
Sphærophthalma arota Blake, ibid, xiii, 218, ♀, 1886.

California: San Diego. Only the unique type seen.

114. **Mutilla ceres** n. sp.

♀.—Ground color: head and thorax ferruginous; abdomen and legs black; head, except vertex, covered with close, appressed, grayish pubescence; vertex, thorax and second dorsal, except at sides and apex, with fulvous pubescence; segments 2-5 with a fringe of white pubescence; remainder of insect with erect, pale pubescence, that on tarsi somewhat golden; punctures of second abdominal segment above and beneath very large and separated; pygidium finely granulated, delicately margined laterally. Length 8 mm.

Arizona. One specimen.

115. **Mutilla zenobia** Blake.

Mutilla zenobia Blake, Tr. Am. Ent. Soc., vii, 250, ♀, 1879.
Sphærophthalma zenobia Blake, ibid, xiii, 220, ♀, 1886.

California.

116. **Mutilla marpesia** Blake.

Mutilla marpesia Blake, Tr. Am. Ent. Soc., vii, 246, ♀, 1879.
Sphærophthalma marpesia Blake, ibid, xiii, 218, ♀, 1886.
Sphærophthalma luteola Blake, ibid, xiii, 235, ♀, 1886.

Kansas (Snow); Utah. Only the two original types seen. It seems that *marpesia* and *luteola* were described from the same specimens.

117. **Mutilla halcyone** n. sp.

♀.—Entirely ferruginous, clothed with pale hair, that on head and thorax above close and appressed, on the abdomen from apex of segment 2 dense and whiter, elsewhere longer and erect, the first segment with a white band at apex; legs rather robust; thorax short, subquadrate; sides with few punctures; second dorsal segment with strong punctures, which appear more or less confluent in consequence of a thin, appressed pubescence, with which the segment is covered; second ventral with stronger punctures; pygidium finely rugose longitudinally. Length 9 mm.

One specimen without precise locality. Occurs probably in the Southwestern United States; very likely in Texas.

118. **Mutilla diomeda** n. sp.

♀.—Entirely ferruginous, clothed with pale pubescence, that on head and pos-

terior half of thorax close and appressed, segments 2-5 fringed with white pubescence, except dorsals 3-5, which are clothed medially with black-brown pubescence, elsewhere the pubescence erect; first segment not banded with white; antennæ thick, first and second joints of flagellum about equal in length; thorax elongate, somewhat pyriform; legs robust; second dorsal covered with strong, separated punctures, those of second ventral stronger; pygidium apparently striated longitudinally. Length 7 mm.

Texas. One specimen.

119. **Mutilla erato** Blake.

Mutilla erato Blake, Tr. Am. Ent. Soc., vii, 251, ♀, 1879.
Sphærophthalma erato Blake, ibid, xiii, 213, ♀, 1886.

Texas. Only the original type specimens seen.

120. **Mutilla albopilosa** Blake.

Mutilla albipilosa Blake, Tr. Am. Ent. Soc., iv, 74, ♀, 1872.
Sphærophthalma albipilosa Blake, ibid, 241, ♀, 1886.

Texas.

121. **Mutilla laodamia** n. sp.

♀.—Ferruginous, clothed with a thin, rather short, pale pubescence, that on thorax above pertaining to yellow; segments 2-5 fringed with whitish pubescence: head with coarse, confluent punctures; first joint of flagellum distinctly longer than second; thorax elongate, pyriform, rugosely punctured above, sides with large punctures; legs comparatively slender; second dorsal segment with large, separated punctures, and at base with coarse, longitudinal rugæ or folds; second ventral with large punctures, the basal median carina strong; third segment strongly punctured, the others rather finely and closely; pygidium finely granulated, not margined. Length 11 mm.

Arizona. One specimen.

122. **Mutilla dirce** n. sp.

♀.—Ferruginous, legs and antennæ rather testaceous; pubescence pale and erect, abdominal segments 2-5 fringed with whitish; head rugoso-punctate, with a thin, appressed pubescence; first joint of flagellum a little shorter than second; thorax short, subtruncate behind, sides rounded, its upper surface covered with rough projections or tubercles; second dorsal segment basally roughened like the thorax, on apical half strongly punctured; second ventral with coarse, irregular punctures, those on remaining segments finer; pygidium finely margined, obtuse at apex, finely granulated. Length 7 mm.

Arizona: Tucson (Wickham). One specimen.

123. **Mutilla myrrha** n. sp.

♀.—Ferruginous, second dorsal apically yellowish; pubescence scant; head finely rugoso-punctate; eyes prominent, unusually convex; first joint of flagellum longer than second; thorax pyriform, rugose above, especially posteriorly, where there are several coarse, transverse folds; second dorsal covered with strong, elongate, more or less confluent punctures, those on second ventral more separated; pygidium margined, subacute at apex, sculpture indistinct, apparently finely striated longitudinally. Length 6 mm.

Colorado: Fort Collins (Gillette). This species bears a close resemblance to *M. caneo* Blake.

124. **Mutilla nanula** D. T.

Mutilla pygmæa Blake, Tr. Am. Ent. Soc, vii, 250. ♀, 1879 (nec Gerstaecker).
Sphærophthalma pygmæa Blake, ibid, xiii, 253, ♀, 1886.
Mutilla nanula Dalla Torre, Cat. Hym., vii, 65,1897.

Texas; Nevada; Colorado. I have only seen specimens from the latter region.

Group *anthophoræ*.

Very similar to group *imperialis*, but with the first and second abdominal segments of female uniting evenly, sessile, the male having the first segment not nodose, but convex, and not more coarsely punctured than the second.

This group formed part of Blake's genus *Photopsis* (= *Agama* Blake), and seems to be the American representative of the European subgenus *Pseudophotopsis* André, from which it differs by the unarmed postscutellum. The species known in the female sex, when hitherto described, have been in nearly every case referred to *Sphærophthalma;* this has also been the case with the females of group *imperialis*.

MALES.

First abdominal segment rather suddenly and distinctly narrowed anterior to its stigma, the punctuation of the second dorsal, as a rule, becoming sparser medially.....2.

First abdominal segment not distinctly contracted anterior to its stigma, but rather evenly narrowed its entire length, the punctuation of second dorsal rather even throughout.....18.

2. First abdominal segment rather narrow and elongate, contracting rather sharply on basal half, its apical width considerably less than that of the second segment, so that the latter is rather sharply contracted to meet it.....3.

First abdominal segment shorter and broader, not contracting very much on basal half, its apical width greater, more nearly sessile with second..10.

3. Wings subhyaline, at the most slightly tinged with yellow.....4.

Wings subfuscous, pubescence of abdomen yellowish.....9.

4. Head not much narrowed behind eyes, at least not enough to make it triangular from above.....5.

Head considerably narrowed and produced behind eyes, apparently triangular when viewed from above; space between hind ocelli greater than that between them and eyes; "wings yellowish-hyaline."
triangularis Blake.

5. Apical abdominal segments more or less fuscous.....7.

Apical segments concolorous with remainder of abdomen, pale castaneous; first and second dorsal segments almost impunctate or nearly so....6.

6. Rather densely pubescent; legs and antennæ pale; space between hind ocelli less than that between them and eyes. Length 14 mm...**ceyx** n. sp.
Pubescence thin; legs and antennæ testaceous-brown; space between hind ocelli a little greater than that between them and eyes. Length 9-10 mm.....**amphion** n. sp.
7. Antennæ and legs pale; first and second dorsal segments impunctate; space between hind ocelli less than that between them and eyes.....8.
Antennæ and legs more or less fuscous; first and second dorsal segments punctured, the latter very sparsely; space between hind ocelli about equal to that between them and eyes.....**concolor** Cress.
8. Head distinctly narrowed behind eyes; wings not yellowish. Length 10 mm. **coloradensis** D. T.
Head broad, not narrowed behind eyes; wings tinged with yellow. Length 16 mm.....**Blakei** Fox (nec Cam.).
9. No black marking in the thoracic sutures, or about the coxæ. Length 8 mm.....**contrahenda** D. T.
Sutures of thorax, especially between scutellum and middle segment and about the coxæ, black. Length 12 mm.....**contrahenda? var?**
10. Wings subhyaline, at most faintly yellow.....11.
Wings more or less subfuscous, or yellow, or yellowish with subfuscous clouding.....14.
11. Head broad, scarcely narrowed behind eyes; legs and antennæ testaceo-fuscous, apical segments usually fuscous.....**uro** Blake.
Head narrowed behind eyes; legs and antennæ pale.....12.
12. Abdomen dark castaneous-brown.....**palamedes** n. sp.
Abdomen pale castaneous.....13.
13. Space between hind ocelli distinctly greater than that between them and eyes; that portion of head behind the latter somewhat semielliptic in shape.....**juxta** Blake.
Space between hind ocelli slightly less than that between them and eyes; head rather square behind eyes.....**infelix** D. T.
14. Body more or less blackish.....16.
Body pale castaneous.....15.
15. Wings with a yellowish tinge, faintly margined with fuscous, a dark rounded cloud in middle of posterior margin of anteriors: pubescence pale; head evenly rounded behind.....**nebulosa** Blake.
Wings broadly and distinctly margined with fuscous; pubescence yellowish; head square behind.....**unicolor** Cress.
16. Entirely black-brown; wings yellow.....**mendica** Blake.
Not entirely dark, the black confined to thorax on sides and beneath, legs and first segment.....17.
17. Head, thorax and abdomen clothed with a reddish pubescence; abdomen entirely castaneous; scape and pedicel testaceous; flagellum black; wings broadly margined with fuscous.....**anthophorae** Ashm
Head, thorax and abdomen with a pale yellowish pubescence; first segment black; antennæ concolorous throughout, testaceous-fuscous; "wings yellowish hyaline, clouded about the middle and apex." **rustica** Blake.
18. Last dorsal segment distinctly margined laterally.....19.
Last dorsal segment smooth, not carinate or margined.....20.

19. Head large, broad, squarely and considerably produced behind eyes; space between hind ocelli equal to but little more than half that between them and eyes; first dorsal segment not banded with white pubescence; legs testaceous.....**pretiosissima** D. T.
Head ordinary rounded behind; space between hind ocelli about equal to that between them and eyes; first dorsal segment banded at apex with white pubescence; legs dark.....**adonis** n. sp.
20. First abdominal segment distinctly longer than it is broad at apex, not altogether sessile with the second.....21.
First abdominal segment shorter and broader, its length nearly equalled by its width at apex, nearly sessile with second .....27.
21. Second dorsal segment distinctly punctured throughout.....22.
Second dorsal segment sparsely or not punctured medially.....24.
22. Ventral carina of first segment even, not prominent posteriorly.....23.
Ventral carina of first segment prominent or produced posteriorly, so that it is bisinuous, or bidentate.....**pallida** Blake.
23. Space between hind ocelli slightly less than that between them and eyes; first segment rather strongly and evenly punctured; legs dark.
tapajos Blake.
Space between hind ocelli distinct less than that between them and eyes; first segment sparsely punctured apically; legs testaceous.
anilus Blake.
24. Insect testaceous brown, venation dark, at least the stigma.....25.
Insect pale yellow, venation very pale, so as to be almost indistinct.....26.
25. Legs rather dark; thorax castaneous; abdomen from second segment blackish; first segment rather strongly convex at apex.**Madejskii** D. T.
Legs pale; head and thorax of a paler color than abdomen, but the latter is not blackish; first segment scarcely convex at apex..**alemon** n. sp.
26. Length 6-7 mm.; middle segment reticulated; form elongate.
aconitus n. sp.
Length about 3 mm.; middle segment not reticulated; form shorter.
Ashmeadii Fox.
27. Insect castaneous.....28.
Insect black; wings pale fusco-hyaline.....**thamyras** n. sp.
28. Wings subhyaline, not fuscous; head rather finely punctured; legs concolorous with body.....**hyalina** Blake.
Wings crossed by a fuscous cloud beyond stigma; head strongly punctured; legs dark.....**sarpedon** n. sp.

FEMALES.

Insect more or less clothed with a dense, appressed pubescence, in addition to the longer, erect hairs.....2.
Insect without appressed pubescence, with erect hairs only.....6.
2. Second dorsal with appressed pubescence, which is quite long throughout; first joint of flagellum nearly as long as two following joints, pedicel short .....3.
Second dorsal with erect hairs only, the head and thorax with short, appressed pubescence, that on apical segments longer, ferruginous; first joint of flagellum but little longer than the second, the pedicel elongate, equalling it in length.....**hypermnestra** n. sp.

3. Pubescence scarlet, grading into fulvous in some specimens (ground color black).....**anthophorae** Ashm.
Pubescence pale golden.....4.
4. Greater part of body (sides of thorax, abdomen, legs) black; thorax tolerably elongate and pyriform; pubescence rather coarse. Length 12 mm. **auraria** Blake.
Greater part of body reddish; thorax shorter, more quadrate; pubescence silky. Length under 7 mm.....5.
5. Thorax anteriorly a little wider than head, rather short; ground color fusco-ferruginous.....**aspasia** Blake.
Thorax anteriorly, if anything, narrower than head, rather elongate; ground color pale ferruginous.....**phaedra** Blake.
6. Thorax short, truncate behind, its upper surface not much longer than wide..7.
Thorax elongate.....8.
7. Thorax above rugoso-punctate, the punctures of second dorsal segment at base strong, apically becoming weak and sparse; a band of white pubescence at apex of segments 1-4; color deep ferruginous. **erigone** n. sp.
Thorax with tolerably strong, separated punctures, the second dorsal similarly punctured, the punctures even throughout; no white bands on abdomen, but a sparse, silvery pubescence on second dorsal; color pale, ferruginous.....**ilione** n. sp.
8. Thorax oblong, truncate and but little narrowed behind (ferruginous, legs testaceous, apical segments fuscous; pubescence sparse). Length 4 mm. **myrmicoides** Ckll.
Thorax pyriform, or considerably narrowed behind, where it is more or less rounded.....9.
9. Entirely pale ferruginous, with long, rather dense, pale hair; second dorsal sparsely punctured.....**zephyritis** n. sp.
Head, thorax and first segment ferruginous, remainder of abdomen and greater part of legs black; pubescence rather short; second dorsal with strong, evenly separated punctures..**sancta-fesae** Ckll. and Fox.

The first seven species have the first abdominal segment rather elongate and narrow, scarcely sessile with second, and distinctly contracted anteriorly from middle.

125. **Mutilla ceyx** n. sp.

♂.—Dark testaceous, clothed with pale pubescence; antennæ and legs paler; head broad, not much narrowed and gently rounded behind; space between hind ocelli but little less than that between them and eyes; antennæ slender, a little longer than head and thorax united, first joint of flagellum almost as long as second, the scape longer than pedicel and first flagellum joint united; reticulation of middle segment coarse, above at base with three longitudinal, strong ridges, forming two smooth areas; first abdominal segment rather long, sparsely punctured, narrowed considerably from about middle to base; second dorsal sparsely punctured at sides, smooth medially; second ventral sparsely punctured; apical segments densely pubescent; wings subhyaline, nervures and stigma testaceous. Length 14 mm.

Lower California: El Paraiso (May), and Calmalli Mines (April).

Two specimens collected by Chas. D. Haines. This species resembles *M. nebulosus*, under which name it is recorded in Proc. Calif. Acad. Sci. (2), iv, 5, 1894, but differs in shape of first abdominal segment.

126. **Mutilla coloradensis** D. T.

Photopsis abdominalis Blake (nec Westwood), Tr. Am. Ent. Soc., xiii, 275 ♂.
Mutilla coloradensis Dalla Torre, Cat. Hym., viii, 25, ♂, 1897.

Colorado. Only the unique type seen.

127. **Mutilla concolor** Cress.

Mutilla concolor Cresson, Proc. Ent. Soc. Phila., iv, 439, ♂. 1865.
Agama concolor Blake, Tr. Am. Ent. Soc., iii, 262, ♂. 1871.
Photopsis concolor Blake, ibid, xiii, 265, ♂, 1886.

Colorado; Texas.

128. **Mutilla Blakei** Fox.

Photopsis Blakei Fox, Proc. Cal. Ac. Sci. (2), vi, 6, ♂, 1893.
Mutilla gautschii Dalla Torre, Cat. Hym., viii, 43, ♂, 1897.

Lower California. The name *Blakei* Fox, given in 1893, has precedence over *Blakei* Cameron, which did not appear until 1894. Dalla Torre's proposition to rename my species *gautschii* is therefore quite uncalled for.

129. **Mutilla amphion** n. sp.

♂.—Castaneous, with pale pubescence; legs and antennæ more testaceous; head narrowed and rather evenly rounded behind, a little narrower than thorax; space between hind ocelli slightly greater than that between them and eyes: antennæ about as long as head and thorax, first joint of flagellum almost as long as second, the scape longer than the pedicel and first flagellum joint; reticulation of middle segment coarse, the two smooth basal areas distinct, but the ridges enclosing them not so strong; first segment elongate, rather slender, sparsely punctured, narrowed anteriorly from middle; second dorsal very sparsely punctured, the second ventral more distinctly punctured, but still not strongly; abdomen not banded with pubescence: wings subhyaline, faintly fuscous in vicinity of marginal cell and middle of hind margin of fore wings, nervures and stigma testaceous. Length 10 mm.

Nevada. Two specimens.

130. **Mutilla triangularis** Blake.

Agama triangularis Blake, Tr. Am. Ent. Soc., ii, 262. ♂. 1871.
Photopsis triangularis Blake, ibid, xiii, 263, ♂, 1886.

Nevada. Only the unique type seen. Quite distinct by shape of head.

131. **Mutilla contrahenda** D. T.

Agama contracta Blake (nec Say), Tr. Am. Ent. Soc., viii, 253, ♂, 1879.
Photopsis contracta Blake, ibid, xiii, 265, ♂, 1886.

Nevada. A specimen from British Columbia, sent by Mr. W. H. Harrington, is larger and has the sutures of thorax blackish; but I can see no structural differences.

The following nine species have the first abdominal segment shorter and more nearly sessile with the second, thereby approaching the species which immediately follow them, differing, however, in that the segment mentioned is considerably contracted anterior to its middle, as in the preceding species of the group.

132. **Mutilla palamedes** n. sp.

♂.—Head and thorax pale castaneous; abdomen dark-castaneous brown, the first segment paler; legs and antennæ testaceous; head narrowed and rather evenly rounded behind, hardly as wide as thorax; space between hind ocelli about equal to that between them and eyes; antennæ scarcely as long as head and thorax, the first joint of flagellum shorter than second, the scape nearly one-third longer than the pedicel and first flagellum joint; reticulation of middle segment tolerably coarse, coarser than in *uro*, the basal smooth areas scarcely distinguishable from the surrounding reticulation; first abdominal segment rather broad and convex, especially apically, with large, separated punctures; second dorsal very sparsely punctured, the punctures of second ventral large and sparse; abdomen without bands of pubescence; wings subhyaline, without fuscous spots, rather strongly iridescent, nervures and stigma testaceous. Length 8 mm.

Texas. One specimen.

133. **Mutilla uro** Blake.

Agama uro Blake, Tr. Am. Ent. Soc., vii, 253, ♂, 1879.
Photopsis uro Blake, ibid, xiii, 273, ♂, 1886.

Texas

134. **Mutilla juxta** Blake.

Agama juxta Blake, Tr. Am. Ent. Soc, iv, 76, ♂, 1872.
Photopsis juxta Blake, ibid, xiii, 270, ♂, 1886.

Texas.

135. **Mutilla infelix** D. T.

Photopsis inconspicuus Blake (nec *Mutilla inconspicuus* Sm.), Tr. Am. Ent. Soc., xiii, 272, ♂, 1886.
Mutilla infelix Dalla Torre, Cat. Hym., viii, 50, ♂, 1897.

California; Lower California.

136. **Mutilla nebulosa** Blake.

Photopsis nebulosus Blake, Tr. Am. Ent. Soc. xiii, 275, ♂, 1886.

California.

137. **Mutilla unicolor** Cress.

Mutilla unicolor Cresson, Proc. Ent. Soc. Phila., iv, 389, ♂, 1865.
Agama unicolor Blake, Tr. Am. Ent. Soc., iii, 261, ♂, 1871.
Photopsis unicolor Blake, ibid, xiii, 261, ♂, 1886.
Mutilla monochroa Dalla Torre, Cat. Hym., viii, 63, ♂, 1897.

California. Dalla Torre, supposing the genus *Myrmosa* a synonym of *Mutilla*, changed the name of this species to *monochroa*, as there is a *Myrmosa unicolor*, which was described prior to the *Mutilla unicolor*. *Myrmosa* is a good genus however.

138. **Mutilla anthophoræ** Ashm.

Sphærophthalma anthophoræ Ashmead, Proc. South. Calif. Acad. Sci., i, No. 3, p. 5, ♀ ♂, 1897.

California. This species is especially interesting, in view of the fact that both sexes are known, having been bred from the cells of a bee, *Aanthophora*.

139. **Mutilla rustica** Blake.

Agama rustica Blake, Tr. Am. Ent. Soc., vii, 252, ♂, 1879.
Photopsis rustica Blake, ibid, xiii, 271, ♂, 1886.

California. Only the unique type seen.

140. **Mutilla mendica** Blake.

Agama mendica Blake, Tr. Am. Ent. Soc., iii, 259, ♂, 1871.
Photopsis mendica Blake, ibid, xiii, 259, ♂, 1886.

Nevada.

The following eleven species have the first segment evenly narrowed its entire length and not suddenly contracted before its middle, and is more sessile with the second segment, being quite short and broad in some species:

141. **Mutilla pretiosissima** D. T.

Photopsis venustus Blake, Tr. Am. Ent. Soc., xiii, 270, ♂, 1886 (nec *Mutilla venustus* Smith).
Mutilla pretiosissima Dalla Torre, Cat. Hym., viii, 74, ♂, 1897.

Arizona. Only the unique type seen. The peculiar flat head in this species is similar to that of the species of the genus *Lyda*.

142. **Mutilla adonis** n. sp.

♂.—Castaneous brown, clothed with erect, white pubescence, the abdominal segments fringed or banded with pubescence of the same color; femora and tibiæ blackish, coxæ and tarsi testaceous; second segment apically and following segments more or less fuscous; head about as wide as thorax, rounded behind; space between hind ocelli about equal to that between them and eyes, if anything, slightly less; antennæ fuscous above, pale beneath, the first joint of flagellum not two-thirds as long as second, the scape about one-quarter longer than the combined length of the pedicel and first flagellum joint and strongly punctured; basal areas of middle segment large and distinct, reticulation large; first abdominal segment evenly and strongly punctured, almost sessile with second, the sides straight, not suddenly contracted anterior to middle; punctures of second dorsal but little sparser medially; pygidium distinctly margined laterally; wings subhyaline, without fuscous spots, nervures testaceous, stigma blackish. Length 15 mm.

New Mexico: Las Cruces, September, 1894 (Cockerell). One specimen.

143. **Mutilla tapajos** Blake.

Agama tapajos Blake, Tr. Am. Ent. Soc., iii, 262. ♂, 1871.
Agama astynax Blake, ibid, vii, 254, ♂, 1879.
Photopsis tapajos Blake, ibid, xiii, 269, ♂, 1886,
Photopsis astynax Blake, ibid, xiii, 272, ♂, 1887.

Texas. There seems to be no appreciable differences between *tapajos* and *astynax*.

144. **Mutilla aulus** Blake.

Agama aulus Blake, Tr. Am. Ent. Soc., iv, 75, ♂, 1872.
Photopsis aulus Blake, ibid, xiii, 270, ♂, 1886.

Texas. Only the unique type seen.

145. **Mutilla pallida** Blake.

Agama pallida Blake, Tr. Am. Ent. Soc., iii, 263, ♀, 1871.
Photopsis pallida Blake, ibid, xiii, 275, ♂, 1886.

Texas.

146. **Mutilla Madejskii** D. T.

Agama bicolor Blake, Tr. Am. Ent. Soc., vii, 252, ♂, 1879 (nec *Mutilla bicolor* Pallas).
Photopsis bicolor Blake, ibid, xiii, 271, ♂, 1886.
Mutilla madejskii Dalla Torre, Cat. Hym., viii, 56, ♂, 1897.

Texas; Arizona.

147. **Mutilla alemon** n. sp.

♂.—Testaceous, slightly brownish, clothed with whitish hairs; legs and antennæ much paler; head rounded behind, wider than thorax, finely punctured; space between hind ocelli slightly less than that between them and eyes; antennæ hardly as long as head and thorax united, scape about one-third longer than the pedicel and first flagellum joint united: basal areas of middle segment distinct, almost as long as its upper surface; first abdominal segment indistinctly punctured, sides straight, not rounded anteriorly from middle, distinctly longer than broad at apex; second dorsal smooth medially, sparsely punctured laterally, the second ventral sparsely punctured throughout; all the segments fringed at apex with short, whitish hair; wings subhyaline, strong, iridescent, without fuscous spots, nervures and stigma testaceous, the latter darker. Length 6-7 mm.

New Mexico: Las Cruces and S. Augustine (Cockerell). Four specimens.

148. **Mutilla acontius** n. sp.

♂.—Yellowish throughout, with thin, pale pubescence; tips of mandibles black; head about as wide as thorax, rather evenly roundly behind and with large punctures; space between hind ocelli slightly less than that between them and eyes; antennæ hardly as long as head and thorax united, the scape about

one-quarter longer than pedicel and first flagellum joint united; middle segment with a broad, central, smooth area, reaching from base two-thirds to the apex, the reticulation feeble and small; first abdominal segment sparsely punctured, rather narrow and convex apically, sides not narrowed anteriorly, from middle straight; second dorsal apparently impunctate, second ventral sparsely punctured; segments not fringed; wings subhyaline, iridescent, nervures and stigma yellowish. Length 5–7 mm.

New Mexico: Las Cruces (Cockerell). Two specimens.

149. **Mutilla hyalina** Blake.

Agama hyalina Blake, Tr. Am. Ent. Soc., iii, 263, ♂, 1871.
Agama minuta Blake, ibid, iv, 76, ♂, 1872.
Photopsis minuta Blake, ibid, xiii, 272, ♀, 1886.
Photopsis hyalina Blake, ibid, xiii, 274, ♂, 1886.

Texas. There seems to be no specific difference between *hyalina* and *minuta*. The latter averages smaller in size.

150. **Mutilla sarpedon** n. sp.

♂.—Reddish castaneous, clothed with whitish pubescence; legs and flagellum blackish; head at most as wide as thorax, strongly punctured, rather square behind eyes; space between hind ocelli less than that between them and eyes; antennæ shorter than head and thorax united, first joint of flagellum nearly as long as second, the scape nearly twice as long as the pedicel and first flagellum joint united; thorax strongly punctured, especially the middle segment, which, unlike most species of the group, is not reticulate, unless the strong punctures, with which it is covered, may be said to form a reticulation, at the base medially are two elongate, parallel, smooth areas; first segment short and broad, sparsely punctured, practically sessile with second; second segment more strongly punctured, especially beneath; segments fringed with a white pubescence, which is more evident when viewed laterally; wings subhyaline, the anteriors crossed by a broad fuscous cloud between middle and apex, nervures dark, stigma black. Length 6–10 mm.

Texas. Eleven specimens. I found these confused with *M. danaus*, to which it is only superficially similar.

151. **Mutilla thamyras** n. sp.

♂.—Black, clothed with a thin, pale pubescence; legs browner; head rounded behind; space between hind ocelli about equal to that between them and eyes; antennæ shorter than head and thorax, the first joint of flagellum considerably shorter than second, the scape twice as long as pedicel and first flagellum joint; thorax strongly punctured; middle segment covered with large, deep punctures, with two elongate, parallel, smooth, basal areas; first abdominal segment sparsely punctured, tolerably sessile with second, comparatively narrowly than in *hyalina* or *sarpedon*; second dorsal sparsely punctured medially, at the sides and on second ventral strongly punctured; segments not fringed; wings subhyaline, slightly fuscous, nervures dark, stigma black. Length 5½ mm.

Texas. One specimen.

The following nine species are known in the female sex only:

152. **Mutilla auraria** Blake.

Mutilla auraria Blake, Tr. Am. Ent. Soc., vii, 248, ♀, 1879.
Sphærophthalma auraria Blake, ibid, xiii, 218, ♀, 1886.

Nevada. Only the unique type seen.

153. **Mutilla aspasia** Blake.

Mutilla aspasia Blake, Tr. Am. Ent. Soc., vii. 250, ♀, 1879.
Sphærophthalma aspasia Blake, xiii, 220, ♀, 1886.

Nevada.

154. **Mutilla phædra** Blake.

Mutilla phædra Blake, Tr. Am. Ent. Soc., vii, 251, ♀, 1879.
Sphærophthalma phædra Blake, ibid, xiii, 219, ♀, 1886.

Nevada. Only the unique type seen.

155. **Mutilla hypermnestra** n. sp.

♀.—Pale ferruginous, clothed above with appressed, dense pubescence, except on second dorsal segment, which has long, erect hairs only; the appressed pubescence pale golden; pubescence of segments 3 and following dense: entire insect with long erect hairs: head not as wide as thorax; first joint of flagellum but little longer than the second, the pedicel elongate, equalling it in length; scape about as long as the following four joints united; thorax short, truncate and narrowed behind, the sculpture of dorsal surface hidden by pubescence; first segment of abdomen short, sessile with second, the latter above with shallow punctures, which are more distinct on ventral surface; pygidium distinctly margined, very finely rugose. Length 3–5 mm.

California: Poway. Eleven specimens.

156. **Mutilla erigone** n. sp.

♀.—Ferruginous, thinly clothed with erect, pale pubescence; abdominal segments fringed with white pubescence apically; head barely as wide as thorax, rugoso-punctate; thorax quadrate, short and broad, truncate and a little narrowed behind, rugoso-punctate above; first abdominal segment sessile with second; second dorsal strongly punctured basally, the punctures becoming sparser and feebler toward apex; pygidium small, not margined, finely granulated. Length 5 mm.

Colorado. One specimen.

157. **Mutilla ilione** n. sp.

♀.—Pale ferruginous, clothed with a sparse, appressed, silvery pubescence and erect, white hairs; abdominal segments not fringed: legs testaceous; head about as wide as thorax, with distinct, separated punctures; first joint of flagellum nearly as long as following two joints united; thorax quadrate, short and broad, a little narrowed posteriorly, where it is broadly truncate, the upper surface more finely punctured than head, except at apex, where it is reticulated: first abdominal segment short, sessile with second, the latter above with the sculpture indistinct, but apparently punctured, beneath the segment is sparsely punctured: pygidium not margined, coriaceous. Length 4 mm.

Texas: Fedor, Lee County (Birkman). Two specimens.

158. **Mutilla myrmicoides** Ckll.

Mutilla parvula Blake, Tr. Am. Ent. Soc., xiii, 206, ♀, 1886 (nec *Mutilla parvula* Fabr.).

Sphærophthalma myrmicoides Cockerell, Ent. News, vi, 62, ♀, 1695.

Alabama; Texas; Colorado. Cockerell's *myrmicoides* is synonymous with *parvula* Blake, but as the latter name is preoccupied, will have to be adopted for this species.

159. **Mutilla zephyritis** n. sp.

♀.—Ferruginous, clothed with a long, tolerably dense, pale pubescence; abdominal segment 2 and following with a fringe of pale hair; legs paler than body; head with coarse, confluent punctures, about as wide as thorax; first joint of flagellum about one-quarter longer than second; thorax pyriform, obtuse behind, rugoso-punctate above; first abdominal segment sessile with second, the latter above with sparse, rather feeble punctures, on the ventral surface the punctures are much stronger and less scattered; pygidium sharply margined laterally, its sculpture indistinct. Length 7 mm.

California: Los Angeles County in May (Coquillett). One specimen belonging to the U. S. National Museum.

160. **Mutilla sanctæ-feæ** Ckll. and Fox.

Mutilla sanctæ-feæ Cockerell and Fox, Proc. Acad. Nat. Sci. Phila., 137, ♀, 1897.

New Mexico. Only the unique type seen.

Group *hexagona* (= *Mutilla* Blake, pt.).

Eyes strongly ovate, facetted, emarginate on inner margin in the male. Mandibles bidentate, emarginate on outer margin in the male, or rather with a blunt process near the base, which, in at least one species, is scarcely developed. Abdomen with segments 1 and 2 sessile, uniting evenly. Thorax of female oblong.

MALES.

Process at base of mandibles largely developed, rarely wanting.....2.

Process at base of mandibles absent or rudimentary, the emargination therefore small.....7.

2. Pubescence of abdomen blackish or griseus, last ventral plate bituberculate..3.

Pubescence of abdomen yellow.....4.

3. Head and thorax entirely black, with a mixed black and griseus pubescence; middle segment above with a smooth, median channel. **hexagona** Say.

Head and thorax reddish in part.....5.

4. Scape slender, scarcely widened at apex, not barbate; pubescence of head and thorax pale..... **nestor** n. sp.

Scape stouter, distinctly wider at apex, and bearing a bunch of dense, pale hairs; pubescence of head and thorax black..... **Grotei** Blake.

5. Wings fuscous; apical segment reddish; scape nude.....6.
Wings subhyaline or subfuscous, crossed by a broad, whitish yellow fascia medially; scape beneath with long, white, matted pubescence; segments 3 and following black.....**barbata** n. sp
6. Punctures of first and second dorsal segments tolerably even and strong, the first segment broader than long; middle segment above without a smooth, median channel, or, if present, it is irregular and poorly developed.....**promethea** Blake.
Punctures of the first and second dorsal segments coarse and widely separated, the first segment longer than broad; middle segment above with a distinct, smooth, median channel.....**floridensis** Blake.
7. Pubescence grayish; ocelli large (wings varying from fuscous to subfuscous). **Sayi** Blake.
Pubescence reddish yellow throughout; wings fuscous.....**rufa** Lep.

FEMALES.

Space between the eyes on an imaginary line drawn across the middle of front is about equal to twice the length of scape, or very little less; legs and abdomen varying from black to red; segment 2 usually with two silvery spots anteriorly, a silvery margin at apex of all segments. **dubitata** Smith.

Space between eyes by no means as great as twice the length of scape; legs black; abdomen red, with first and third segments entirely, apex of second, and fourth ventral entirely, black; second segment with a silvery margin, which, dorsally, extends forward medially for one-quarter of the length of segment.....**euterpe** Blake.

161. **Mutilla hexagona** Say.

Mutilla hexagona Say, Bost. Journ. Nat. Hist., i, p. 295, ♂; LeConte Ed. Say's Entom., ii, p. 738, 1859.

Mutilla hexagona, other authors.

Mutilla briaxus Blake, Tr. Am. Ent. Soc., iii, p. 227, ♂, 1871.

I have seen specimens of this species from most parts of the United States, excepting the extreme western and southwestern regions. It is also found in Canada and British Columbia. *M. dubitata* is probably the female sex.

M. briaxus does not even represent a variety of this species.

M vigilans Say, referred by some authors as a variety of *hexagona*, evidently belongs near *M. fenestrata*, as far as can be ascertained from the meagre description by Say. At any rate, by the truncated marginal cell it is distinct from *hexagona*, and, moreover, the abdomen is said to be differently colored, agreeing in many respects with the forms allied to *fenestrata*.

162. **Mutilla dubitata** Sm.

Mutilla dubitata Smith, Cat. Hym. Brit. Mus., iii, p. 60, 1855, ♀, and of other authors.

Mutilla ornativentris Cresson, Proc. Ent. Soc. Phila., iv, p. 438, 1865. ♀, and of other authors.

This species has precisely the same geographical distribution as the preceding one.

M. ornativentris Cresson is synonymous with *dubitata*, the color of legs and abdomen varying from black to red, or *vice versa*.

163. **Mutilla uestor** n. sp.

♂.—Head and thorax black, clothed with griseus pubescence, including the first abdominal segment; remainder of abdomen red, clothed with yellowish pubescence; head with deep, separated punctures; scape elongate, curved, but little widened apically, without a brush of dense pubescence; middle segment with a distinct, smooth, shallow channel above in the middle; first abdominal segment slightly longer than it is broad apically, with large, separated punctures, those of the second less strong and sparse medially; remaining segments more finely punctured; last ventral segment tuberculate; wings fuscous. Length 9 mm.

Texas. One specimen. Resembles *Grotei*, but is smaller, scape of antennæ different, etc.

164. **Mutilla Grotei** Bl.

Mutilla Grotei Blake, Tr. Am. Ent. Soc., iii, p. 228, ♂, 1871.

Colorado. I have seen only the unique type of this species.

165. **Mutilla promethea** Bl.

Mutilla promethea Blake, l. c., p. 229, ♂.

Georgia; Florida; Louisiana; Texas. The extent of red and black on thorax is subject to variation. Either this species or *floridensis* is probably the male of *euterpe*.

166. **Mutilla floridensis** Bl.

Mutilla floridensis Blake, l. c., vii, p. 249, ♂, 1879.

Florida; Georgia. This is a less hirsute and smaller species than *promethea*, and the color is of a deeper red. The head varies from black to red. In the shape of first abdominal segment this species stands rather intermediate between the typical forms of group *hexagona* and those of group *scrupea*.

167. **Mutilla Sayi** Bl.

Mutilla Sayi Blake, l. c., iii, p. 229, ♂, 1871.

Texas; Colorado; Montana. Specimens from the two latter States differ from Texan examples in the lighter wings and greater extent of red on thorax.

168. **Mutilla rufa** Lep.

Mutilla rufa Lepeletier de St. Fargeau, Hist. Nat. Ins. Hymen., iii, p. 631, ♂, 1845; Blake, l. c., iii, p. 257, ♂, 1871.

Described originally from Pennsylvania, and Blake gives "Atlantic States" as its habitat. There is but one specimen before me and that without locality.

It is doubtful, in my mind, if the species recognized as *rufa* by Blake is really that species, but the original description is too meagre to permit a positive conclusion in the matter.

169. **Mutilla enterpe** Blake.

Mutilla enterpe Blake, l. c., vii, p. 249, ♀, 1879.

Florida. Only the unique type seen, which was collected at Enterprise, Florida, in May.

170. **Mutilla barbata** n. sp.

♂.—Ferruginous, flagellum, legs and segments 3 and following black; scape yellowish, beneath with long, white hairs; pubescence griseus; flagellum acuminate, the basal joint broad and flat; first segment with large, separated punctures, as is also the second dorsal at base, the punctures becoming sparser medially and closer at apex; wings subfuscous, the superiors crossed by broad, whitish yellow fascia medially. Length 8 mm.

Missouri: Ripley County (P. J. Smith). One specimen sent me by the Rev. Rich'd Kraus, of St. Vincent Abbey, Pennsylvania.

Group *scrupea* (= *Mutilla* Blake, pt.).

Eyes short and broad, facetted, emarginate on inner margin in male. Mandibles bidentate, not emarginate or bearing a process outwardly. Abdominal segment 1 distinctly narrower at apex than second, usually cylindrical. Thorax of female ovate.

The marginal cell tends rather to truncate, and the number of submarginal cells varies from two to three. Only one species, *puteola*, is known in the female sex.

MALES.

Entirely black.....**scrupea** Say.
More or less red.....2.
2. Head and thorax black, abdomen red.....**copano** Blake.
Ferruginous, legs and antennæ black.....**Slossonæ** n. sp.

171. **Mutilla scrupea** Say.

Mutilla scrupea Say, Bost. Jour. Nat. Hist., i, p. 297, 1836, ♂; LeConte Ed. Say's Ent., ii, p. 740, ♂, 1859.
Mutilla scrupea Blake, l. c., p. 230, ♂, 1871.
Mutilla gracilis Blake (not Smith), ibid, p. 231, ♂, 1871.

Connecticut; Delaware; Texas; Colorado; Montana; California. The western specimens are by far the larger, but I am unable to detect any satisfactory character entitling them to specific rank. These are the *gracilis* Blake (not Smith); the true *gracilis* inhabits Mexico, and has a more cylindrical first abdominal segment.

172. **Mutilla copano** Blake.

Mutilla copano Blake, l. c., iii, p. 232, ♂, 1871.

Texas; Mexico.

173. **Mutilla Slossonæ** n. sp.

♂.—Ferruginous, with sparse, pale pubescence; legs and antennæ black; head with coarse, deep punctures; space between hind ocelli not equal to half that between them and eyes; first abdominal segment smaller than second, nodose, coarsely punctured and transversely carinated above, the ventral carina prominently elongated anteriorly; second segment above with large, separated punctures, those of under surface coarser; dorsals 3-7 sharply carinated down middle; wings subfuscous, marginal cell subtruncate; first and second segments with a fascia of white pubescence at apex. Length 8 mm.

Florida (Mrs. A. T. Slosson). One specimen.

174. **Mutilla puteola** Blake.

Mutilla puteola Blake, l. c., p. 252, ♀, 1879.

Texas; Florida: Lake Harney, May; Alabama: Selma, October; Virginia: Pennington Gap. This is probably the female of *scrupea*.

Unidentified Species.

175. **Mutilla argentipilis** Prov.

Sphærophthalma argentipilis Provancher, Add. Hym. Quebec. 251, ♂, 1887.

Florida.

176. **Mutilla erecta** Fox.

Sphærophthalma erecta Fox, Proc. Cal. Acad. (2), iv, 93, ♀, 1894.

Lower California. This species belongs to group *canadensis*. The type is in the coll. Calif. Academy of Sciences, so I have been unable to examine it.

177. **Mutilla frigida** Sm.

Mutilla frigida Smith, Cat. Hym. Brit. Mus., iii, 298, ♀, 1855.
Sphærophthalma frigida Blake, Tr. Am. Ent. Soc., xiii, 239, ♀, 1886.

Arctic America: Great Bear Lake. The position of this species is doubtful from the description. It may be identical with *M. dubitata* Sm., or closely allied.

178. **Mutilla exulans** Fabr.

Mutilla exulans Fabricius, Syst. Ent., 397, 1775.

"Habitat in America." This may not be a boreal American species.

179. **Mutilla versicolor** Fabr.

Mutilla versicolor Fabricius, Syst. Ent., 397, 1775.

"Habitat in America." Dalla Torre in his "Catalogue" gives Florida as the habitat of this species.

180. **Mutilla vagans** Fabr.
Mutilla vagans Fabricius, Ent. Syst. Suppl., 282, ♀, 1798.

Boreal America.

181. **Mutilla secunda** D. T.
Mutilla canadensis Provancher, Add. Hym. Quebec, 250, ♂, 1887.
Mutilla secunda Dalla Torre, Cat. Hym., viii, 84, ♂, 1897.

Canada. This is not the same as *Photopsis canadensis* Provancher, or *Sphærophthalma canadensis* Blake. It belongs to group *hexagona* and may be a variety of that species.

182. **Mutilla contracta** Say.
Mutilla contracta Say, Bost. Jour. N. H., i, 295, ♂, 1836.

Arkansas and Missouri. This is not the *M. contracta* Blake which is identical with *hexagona*. I am inclined to regard *contracta* Say as belonging to the series with tridentate mandibles, as, judging from the description, it has a third submarginal cell similar to the species of that series, notwithstanding that Say described the eyes as emarginate.

183. **Mutilla tertia** D. T.
Photopsis canadensis Provancher, Add. Hym. Quebec, 410, ♂, 1888 (nec Blake).
Mutilla tertia Dalla Torre, Cat. Hym., viii, 91, ♂, 1897.

Canada. This is not the same as *Mutilla canadensis* Provancher.

184. **Mutilla vigilans** Say.
Mutilla vigilans Say.

This species is not identical with *hexagona* Say. See note under *M. hexagona*.

II. Subfamily THYNNINÆ.

The characters offered herein for the separation of the Mutillinæ and Thynninæ have apparently never been used by previous writers in defining the Mutillidæ and Thynnidæ, which have hitherto been generally regarded as families. The use of these characteristics necessitate the breaking down of old boundaries, so that some genera are relegated thereby from one family, or subfamily, into the other. For instance, the divided thorax of female and armature of tip of male abdomen remove *Myrmosa*, *Methoca*, *Brachycistis* and *Chyphotes* from the Mutillidæ (Mutillinæ) into the Thynnidæ (Thyninnæ), which gives the latter subfamily a strong representation in our fauna.

The Thyninnæ of the United States are divisible into five genera as follows:

FEMALES.

Thorax divided into two parts.
  Ocelli absent.
    Abdomen attached to thorax by a slender petiole.....**Chyphotes** Blake.
    Abdomen sessile with thorax.....**Brachycistis** Fox.
  Ocelli present; abdomen sessile with thorax.....**Myrmosa** Latr.
Thorax divided into three parts.
  Legs slender, not flattened; ocelli present.
    Body strongly punctured; median tibiæ 2-spurred.....**Morsyma** n. g.
    Body smooth, ant-like; median tibiæ 1-spurred.....**Methoca** Latr.
  Legs short, strongly flattened; ocelli absent.....**Glyptometopa** Ashm.

MALES.

Abdomen provided with a curved spine at tip.
  Ocelli enlarged; mandibles stout; venation confined to basal half of wing.
    Median tibiæ 2-spurred.....**Chyphotes** Blake.
    Median tibiæ 1-spurred.....**Brachycistis** Fox.
  Ocelli normal; mandibles slender; venation almost reaching apex of wing.
    Methoca Latr.
Abdomen not spinose at tip.
  Maxillæ small, indistinct.....**Myrmosa** Latr.
  Maxillæ large, elongate, prominent.....**Telephoromyia** Guerin.

The males of *Glytometopa* and *Morsyma* are unknown.

CHYPHOTES Blake.

This genus contained but one species *C. elevatus* Blake, and only the female was known until Mr. Ashmead discovered several species described as *Photopsis* and representing the male sex. These were *Photopsis albipes, belfragei, melaniceps* and *attenuata.* To these should be added *Photopsis nubecula, mellipes* and *picus*, the two latter now being referred to the synonymy. *Mutilla peculiaris* Cresson is also a *Chyphotes.*

FEMALES.

Node of first abdominal segment broader than long, the petiole entering it beneath; no silvery ornamentation; eyes irregularly ovate, smooth and shining.....2.

Node of first segment longer than broad, joined with petiole in such a way as to be continuous with it; body ornamented with silvery pubescence; eyes elongate-ovate, distinctly facetted.....**peculiaris** Cress.

2. Legs more or less dark; third dorsal blackish.....3.
   Legs pale testaceous; abdomen concolorous, not at all black.....4.
3. Second dorsal segment with shallow, scattered punctures, the second ventral with coarse, scattered punctures, those on thorax above tolerably large and separated. Length 9 mm.....**elevatus** Blake.

Second dorsal segment with rather close, coarse punctures, especially toward base; second ventral with sparse, shallow punctures; thorax above with coarse punctures. Length 4 mm.....**punctatus** n. sp.

4. Petiole short, stout, not as long as hind tibia, somewhat curved; second ventral with rather fine, sparse punctures. Length 9 mm.

testaceipes n. sp.

Petiole comparatively longer and slender, as long as hind tibia, straight; second ventral segment with large, scattered punctures. Length 4-6 mm.

petiolatus n. sp.

MALES.

Wings with two submarginal cells.....2.

Wings with three submarginal cells.....5.

2. Second submarginal cell as long as first, not triangular; abdomen coarsely punctured.....3.

Second submarginal cell small, not half the size of first, triangular; swollen portion of first segment rugoso-punctate, the second dorsal with large, separated punctures (head obtusely rounded behind).

attenuata Blake.

3. Head truncate behind, not much produced behind eyes; petiolated portion of first segment shorter than first medial tarsal joint, the enlarged portion broadly ovate; legs as a rule blackish or testaceous-brown.

Belfragei Blake.

Head rounded behind, considerably produced behind eyes.....4.

4. Segments 1 and 2 rugoso-punctate; petiolated portion of first segment, if anything, shorter than first joint of median tarsi; head black.

melaniceps Blake.

Segments 1 and 2 with strong, even, separated punctures; petiolated portion of first segment fully as long as first joint of median tarsi; head concolorous with remainder of insect, castaneous.**peninsularis** n. sp.

5. Third submarginal cell distinctly broadened above; first and second transverso-cubital veins uniting above; stigma usually brownish.

albipes Cress.

Third submarginal cell not or scarcely widened above; first and second transverso-cubital veins somewhat separated above; stigma blackish.

nubecula Cress.

Chyphotes is divisible into two groups or subgenera, one represented by *C. peculiaris* and the other containing all the other species.

1. **Chyphotes elevatus** Blake.

Chyphotes elevatus Blake, Tr. Am. Ent. Soc., xiii, 276, ♀, 1886.
Mutilla elevata Dalla Torre, Cat. Hym., viii, 34, ♀, 1887.

Arizona; New Mexico: Santa Fé, August (Cockerell). The California examples mentioned by Blake are a different species, which I describe as *C. petiolatus*.

2. **Chyphotes punctatus** n. sp.

♀.—Ferruginous, with sparse, white hairs; third dorsal segment and femora

blackish; antennæ and tarsi testaceous; head strongly punctured; thorax rugoso-punctate above; second dorsal segment with strong, rather close punctures, especially toward base, those of first dorsal feebler and sparser, as are likewise those of second ventral. Length 4 mm.

Arizona: Chiric Mts., July 29th (H. H. Hubbard). One specimen in collection of U. S. National Museum.

3. **Chyphotes testaceipes** n. sp.

♀.—Testaceo-ferruginous, clothed with long, palish, not whitish, hairs; abdomen concolorous; legs and antennæ testaceous; punctures of head strong and separated; thorax with strong, separated punctures; petiole short, stout, not as long as hind tibiæ, curved; first and second dorsal segment with separated punctures, less strong and more separated than in *elevatus* and *punctatus*; punctures of second ventral small, sparse and shallow. Length 9 mm.

Arizona: Phoenix (H. G. Griffith). One example. This species is more hairy than either of the two preceding species.

4. **Chyphotes petiolatus** n. sp.

♀.—Testaceo-ferruginous, clothed with long, grayish pubescence, beneath which there is, in some specimens, a shorter, appressed, yellowish pubescence; antennæ and legs testaceous; abdomen concolorous; punctures of head and thorax practically the same as in *C. testaceipes*, perhaps a little closer on thorax; petiole about as long as hind tibiæ, rather slender, straight; first and second dorsal segments with strong, separated, rounded punctures, those on second ventral larger, deeper and sparser, especially sparse medially. Length 4-6 mm.

The following six species are known in the male sex only. Of these *attenuata*, *Belfragei*, *peninsularis* and *melaniceps* have two submarginal cells, whereas in *nubecula* and *albipes* there are three submarginals.

5. **Chyphotes Belfragei** Blake.

Agama Belfragei Blake, Tr. Am. Ent. Soc, iii, 263, ♂, 1871.
Photopsis Belfragei ibid, xiii, 263, ♂, 1886.
Mutilla Belfragei Dalla Torre, Cat. Hym., viii, 15, ♂, 1897.

Texas; Arizona; New Mexico.

6. **Chyphotes melaniceps** Blake.

Photopsis melaniceps Blake, Tr. Am. Ent. Soc., xiii, 264, ♂, 1886.
Mutilla melaniceps Dalla Torre, Cat. Hym., viii, 60, ♂, 1897.

The type of this species is without locality label. Blake gave Arizona as its habitat.

7. **Chyphotes peninsularis** n. sp.

♂.—Castaneous-brown, clothed with long, whitish pubescence, which is thickest on abdomen; legs pale testaceous, the antennæ slightly darker; head rounded and considerably produced behind eyes, with distinct, separated punctures; dorsulum punctured about like the head and not as strongly as in *melani-*

ceps; petiolated portion of first abdominal segment fully as long as the first joint of medial tarsi, the enlarged portion elongate-ovate, with rather coarse, close punctures; second dorsal with similar punctures, but they are more separated: third dorsal with sparse, finer punctures; wings subhyaline, slightly yellowish, with a fuscous cloud near apex, nervures and stigma testaceous, two submarginal cells. Length 12 mm.

Lower California. One specimen.

8. **Chyphotes attenuata** Blake.

Agama attenuata Blake, Tr. Am. Ent. Soc., iv, 76, ♂, 1872.
Photopsis attenuata Blake, ibid, xiii, 264, ♂, 1886.
Photopsis mellipes Blake, ibid, xiii, 262, ♂, 1886.
Photopsis picus Cockerell, ibid, xxii, 292, ♂, 1895.
Mutilla picas Dalla Torre, Cat. Hym., viii, 73, ♂, 1897.
Mutilla tenula Dalla Torre, ibid, viii, 91, ♂, 1897.

Texas; Arizona; New Mexico. I have seen the type of *Photopsis picus* Cockerell, and have no doubt as to its identity with *Chyphotes attenuatus*, with which the description agrees. *Photopsis mellipes* Blake, which I formerly held to be identical with *Belfragei*,* is the same as *attenuatus*.

9. **Chyphotes albipes** Cress.

Agama albipes Cresson, Tr. Am. Ent. Soc., v, 99, ♂, 1874; Rep. Geogr. and Geol. Explor. and Surv. 100th Mer., v, 711, pl. 33, f. 2. ♂. 1875.
Photopsis albipes Blake, Tr. Am. Ent. Soc., xiii, 268, ♂. 1886.
Mutilla albipes Dalla Torre, Cat. Hym., viii, 7, ♂, 1897.

Nevada; Colorado.

10. **Chyphotes nubeculus** Cress.

Mutilla nubecula Cresson, Proc. Ent. Soc. Phila., iv, 440, ♂, 1865.
Agama nubecula Blake, Tr. Am. Ent. Soc., iii, 264, ♂, 1871.
Photopsis nubecula Blake, ibid, xiii, 266, ♂, 1886.
Mutilla nubecula Dalla Torre, Cat. Hym., viii, 67, ♂. 1897.

Colorado. This species is peculiar by having the fourth and fifth ventral segments furnished with two brush-like bunches of stiff, bristle-like hairs, thereby differing from all the other known species.

M. peculiaris is quite distinct in the shape of first abdominal segment, facetted eyes and silvery ornamentation from the other species of the genus. These characters, in this case, are not of greater value than subgeneric.

11. **Chyphotes peculiaris** Cress.

Mutilla peculiaris Cresson, Tr. Am. Ent. Soc., v. 119, ♀, 1875.
Chyphotes mirabilis Cockerell, Can. Ent., 284, ♀, 1896.

California; New Mexico (Cockerell).

* See article by Cockerell, Tr. Am. Ent. Soc., xxii, 289, 1895.

BRACHYCISTIS Fox.

The two species herein, considered as females of this group, differ from the males in having a two-spurred medial tibia. It is therefore not certain that these are really the female of *Brachycistis*, inasmuch as in the other genera of the family the number of spurs of the tibiæ does not differ in the sexes. Nevertheless, it has been thought advisable to keep the specimens in question in this position until something definite may be learned of their habits, etc. Should they prove not to be *Brachycistis*, then that genus is the only one of the North American Mutillidæ, of which but one sex is known. To be sure, Mr. Ashmead has already characterized the female of this genus as having a one-spurred medial tibiæ, but he does not state on what species this assertion is based; so I take it for granted that the genus was not known to him in the female sex, and that the characterization in question was put forth hypothetically.

MALES.

First abdominal segment elongate, drawn out anteriorly into a slender neck...2.
First abdominal segment short, generally sessile with second, not drawn out into a slender neck anteriorly.....14.

2. Head very small, narrower than thorax; form unusually slender; first segment almost linear.....**ampla** Blake.
   Head at least as wide as thorax; form more robust; first segment varying from a slender, elongate form to almost campanulate.....3.
3. Marginal cell nearly as long as the stigma.....**idotes** Ckll.
   Marginal cell much shorter than stigma, not more than half as long at the most.....4.
4. First segment elongate, its width at apex not by any means as great as half its length.....5.
   First segment shorter, broad at apex, which width is equal, or nearly so, to half the length of the segment.....10.
5. Thorax and abdomen entirely castaneous.....6.
   Thorax and abdomen black or quite dark.....8.
6. Head scarcely narrowed behind, concolorous with thorax (second submarginal cell variable).....**nitida** Cress.
   Head black.....7.
7. First segment slender, at least one quarter longer than second; abdomen not hirsute; thorax, abdomen and legs dark castaneous; head considerably narrowed behind eyes.....**nudus** n. sp.
   First segment stout, not one-quarter longer than second, abdomen sparsely pubescent; thorax and abdomen light castaneous, legs testaceous; antennæ orange; head but little narrowed behind eyes.
   elegantulus Ckll.
8. Stigma of wings pale yellow; legs, except coxæ, mandibles and antennæ, yellowish; thorax brownish or wine colored.....**petiolatus** Fox.

Stigma of wings and legs, except tibiæ and tarsi, black; antennæ variable; body entirely black.....9.

9. Abdomen very sparsely pubescent; second dorsal indistinctly punctured...10.
Abdomen with rather dense, white pubescence; second dorsal with large, separated punctures.....**atrata** Blake

10. Head produced behind eyes, subtruncate behind; third submarginal cell longer than high.....**nigritus** n. sp.
Head evenly rounded behind, not produced behind eyes; third submarginal cell higher than long.....**contiguus** n. sp.

11. Head black.....12.
Head concolorous with thorax.....13.

12. Upper surface of middle segment bounded by a sharp ridge.
carinatus n. sp.
Middle segment not ridged.....**glabrella** Cress.

13. Space between hind ocelli considerably greater than that between them and eyes, the latter black; head narrowed behind....**inæqualis** n. sp.
Space between hind ocelli about equal to that between them and eyes, the latter greenish; head but little narrowed behind.
subquadratus n. sp.

14. Marginal cell at least half as long as stigma; three submarginals.....15.
Marginal cell very small, not half as long as stigma; two submarginals.
perpunctatus Ckll.

15. Third submarginal cell elongate, longer than high.....16.
Third submarginal cell shorter than high or quadrate.....17.

16. Marginal cell fully as long as the stigma; first and second transverso-cubital veins not uniting above.....**sequalis** n. sp.
Marginal cell shorter than stigma; second submarginal cell almost petiolate.
nevadensis n. sp.

17. Body entirely castaneous.....18.
Head black; abdomen fuscous beyond first segment; second submarginal cell petiolate, with a long petiole; third submarginal subquadrate.
indiscretus n. sp.

18. First and second submarginal cells nearly equal in length; space between hind ocelli about equal to that between them and eyes; color dark castaneous.....**castaneus** Cress.
Second submarginal cell triangular, much smaller than first, almost petiolate; space between hind ocelli greater than that between them and eyes.
triangularis n. sp.

19. Castaneous; antennæ and legs testaceous; first and second submarginals nearly equal in length.....**brevis** n. sp.
Black; antennæ brownish; second submarginal cell triangular, smaller than the first.....**perpunctatus** Ckll.

FEMALES.

Dark castaneous; two spots on second segment and one at base of sixth yellow; dorsals 1-3 blackish at apex. Length 6 mm.....**rutilans** Blake.

Testaceo-castaneous; two spots on second dorsal and sixth dorsal at base and apex yellow; third dorsal blackish. Length 4 mm.
bimaculatus n. sp.

1. **Brachycistis amplus** Blake.

Ayama ampla Blake, Tr. Am. Ent. Soc., vii, 253, ♂, 1879.
Photopsis amplus Blake, ibid, xiii, 266, ♂, 1886.
Brachycistis amplus Fox, Ent. News, v, 296, 1894.
Mutilla ampla Dalla Torre, Cat. Hym., viii, 8, 1897.

Colorado: Custer (Cockerell).

2. **Brachycistis idiotes** Ckll.

Brachycistis idiotes Cockerell, Ent. News, vi, 63, ♂, 1895.
Mutilla idiotes Dalla Torre, Cat. Hym., viii, 49, 1898.

New Mexico: Las Cruces, November 21st (Cockerell).

3. **Brachycistis nitidus** Cress.

Agama nitida Cresson, Wheeler's Survey W. 100th Mer., v. 710, ♂, 1875.
Photopsis nitidus Blake, Tr. Am. Ent. Soc., xiii, 267, ♂, 1886.
Photopsis sobrinus Blake, ibid, xiii, 268, ♂, 1886.
Photopsis lepidus Blake, ibid, xiii, 269, ♂, 1886.
Brachycistis nitidus Fox, Ent. News, v, 296, 1894.
Brachycistis lepidus Fox, ibid.
Brachycistis sobrinus Fox, ibid.
Mutilla lepida Dalla Torre, Cat. Hym., viii, 52, 1897.
Mutilla nitida Dalla Torre, ibid, viii, 66, 1897.
Mutilla sobrina Dalla Torre, ibid, viii, 86, 1897.

Colorado; New Mexico. I am unable to detect specific differences in *nitidus*, *sobrinus* and *lepidus*. The convexity of first segment seems to vary, the segment being tolerably flat in *nitida*, and decidedly convex in *lepidus*, the intermediate form existing in *sobrinus*.

4. **Brachycistis nudus** n. sp.

♂.—Dark castaneous, legs darker; head black; antennæ brownish; tarsi testaceous; entire insect almost nude, except for a few hairs on the thorax beneath; head distinctly narrowed behind; space between hind ocelli greater than that between them and eyes; dorsulum indistinctly punctured; middle segment smooth above, posterior surface with large, sparse punctures apically; first abdominal segment strongly punctured basally, elongate, the basal portion quite slender, with the apical portion swollen, so as to make it clavate; remaining segments distinctly punctured, but not closely; wings subhyaline; nervures testaceous; stigma dark brown; second submarginal cell triangular, the first and second transverso-cubital veins uniting above; marginal cell about half as long as the stigma. Length 10 mm.

California. One specimen.

The third submarginal cell is partially obliterated in the specimen before me, which possesses but one superior wing, but from appearances it is quadrate in perfect specimens, and is quite as long as the second submarginal on the cubital nervure.

5. **Brachycistis petiolatus** Fox.

Brachycistis petiolatus Fox, Proc. Calif. Ac. Sc. (2), iv, 8. ♂, 1893.
Mutilla petiolata Dalla Torre, Cat. Hym., viii, 72, 1897.

Lower California: Calmalli Mines, April.

6. **Brachycistis nigritus** n. sp.

♂.—Black, clothed with thin, pale bubescence, especially on abdomen; tibiæ and tarsi pale brownish, the tarsi palest; antennæ brown; head transverse, narrowed behind, but not strongly; space between hind ocelli distinctly greater than that between them and eyes; middle segment with large, shallow punctures posteriorly; first dorsal segment strongly punctured, much broader at apex than at base, strongly convex apically, in length somewhat greater than the second segment, remaining segments with shallow, scattered punctures, those on second ventral largest; wings subhyaline, nervures testaceous, stigma blackish; marginal cell barely half as long as stigma; third submarginal larger than second, but little narrowed above. Length 8-10 mm.

Washington; Nevada. Two specimens.

7. **Brachycistis contiguus** n. sp.

♂.—Close to *nigritus*, but differing by the head being evenly rounded behind, not produced behind eyes; slenderer form; third submarginal cell higher than long, the second usually petiolate or nearly so; middle segment finely punctured posteriorly. Length 7-8 mm.

Nevada. Five specimens.

8. **Brachycistis atratus** Blake.

Agama atrata Blake, Tr. Am. Ent. Soc., vii, 253, ♂, 1879.
Photopsis atrata Blake, ibid, xiii, 268, ♂, 1886.
Mutilla agama Dalla Torre, Cat. Hym., viii, 7, 1897.

Nevada.

9. **Brachycistis elegantulus** Ckll. and Casad.

Brachycistis elegantulus Cockerell and Casad, Ent. News, v, 295, ♂, 1894.
Mutilla elegantula Dalla Torre, Cat. Hym., viii, 34, 1897.

New Mexico: Las Cruces.

10. **Brachycistis inæqualis** n. sp.

♂.—Pale castaneous, sparsely clothed with pale, not whitish pubescence; legs testaceous; antennæ darker; head narrowed behind eyes, subtruncate behind; space between hind ocelli distinctly greater than that between them and eyes, the latter black; first abdominal segment slender basally, but greatly broadened at apex, rather campanulate, covered with shallow, not strong punctures; wings subhyaline, nervures and stigma testaceous, the latter darkest; marginal cell barely half as long as stigma; third submarginal subquadrate, slightly longer than high, the second triangular, shorter than the third on the cubital nervure. Length 10-11 mm.

California: Los Angeles, September. Twelve specimens. Type in collection of U. S. National Museum.

11. **Brachycistis subquadratus** n. sp.

♂.—Pale castaneous, clothed with sparse, pale pubescence; antennæ paler;

legs brownish, tarsi testaceous; head subquadrate, produced, but not much narrowed behind eyes: space between hind ocelli about equal to that between them and eyes, the latter greenish; first abdominal segment not very narrow basally, broadened from near base gradually to apex, sparsely and rather strongly punctured; wings subhyaline; nervures testaceous; stigma dark brown; marginal cell not more than half as long as stigma; third submarginal higher than long, shorter than the second on the cubital nervure; second submarginal cell triangular, the first and second transverso-cubital veins not meeting above. Length 10 mm.

California. One specimen.

12. **Brachycistis glabrella** Cress.

Mutilla glabrella Cresson, Proc. Ent. Soc. Phila., iv, 441, ♂, 1865.
Agama glabrella Blake, Tr. Am. Ent. Soc., iii, 264, ♂, 1871.
Agama alcanor Blake, ibid, iii, 264, ♂, 1871.
Photopsis alcanor Blake, ibid, xiii, 267, ♂, 1886.
Photopsis glabrella Blake, ibid, xiii, 274, ♂, 1886.
Mutilla alcanor Dalla Torre, Cat. Hym., viii, 8, 1897.
Mutilla glabrella Dalla Torre, ibid, viii, 22, 1897.

Colorado; Texas; New Mexico; Arizona; California. *B. alcanor* is apparently not distinct from *glabrella*.

13. **Brachycistis carinatus** n. sp.

♂.—Castaneous, very sparsely pubescent; head black; antennæ and eyes pale castaneous; tarsi rather testaceous; head produced and a little narrowed behind eyes; space between hind ocelli greater than that between them and eyes; dorsulum and scutellum with distinct, sparse punctures; middle segment with a sharp, transverse ridge medially, which runs to the base at sides, thereby enclosing the upper surface, which is rather deeply sulcate down middle; first segment of abdomen long, greatly broadened at apex, slender basally, with sparse punctures; wings subhyaline, nervures and stigma dark brown: marginal cell not two-thirds as long as stigma; third submarginal about as long as high, much larger than the second, which is subtriangular, and much shorter than the third on the cubital nervure; first and second transverso-cubital veins not meeting above. Length 14 mm.

California. One specimen.

The next seven species have the first abdominal segment short and broad, not produced into a slender neck anteriorly.

14. **Brachycistis castaneus** Cress.

Mutilla castanea Cresson, Tr. Am. Ent. Soc., iv, 388, ♂, 1865.
Agama castanea Blake, Tr. Am. Ent. Soc, iii, 264, 1871.
Photopsis castanea Blake, ibid, xiii, 273, 1886.
Mutilla castanea Dalla Torre, Cat. Hym., viii, 21, 1897.

California; Arizona; Lower California.

15. **Brachycistis nevadensis** n. sp.

♂.—Pale castaneus, sparsely clothed with pale, not whitish pubescence; legs

testaceous; antennæ darker; head scarcely narrowed or produced behind eyes, subrounded behind; space between hind ocelli much greater than that between them and eyes; dorsulum and scutellum with distinct, sparse punctures: middle segment with large, shallow punctures posteriorly; first abdominal segment convex, broadened from base to apex, finely punctured medially, more strongly toward sides, in length somewhat longer than second, subpyriform; wings subhyaline, nervures and stigma testaceous; marginal cell nearly two-thirds as long as stigma; third submarginal subquadrate, longer than high; second submarginal small, subpetiolate, much shorter than third on cubital nervure. Length 10 mm.

Nevada. One specimen. The first segment is rather similar to that of *glabrella*, etc., but the basal neck is quite stout, not slender.

16. **Brachycistis indiscretus** n. sp.

♂.—Head black; thorax and first segment pale castaneous; segments 2 and following dark brown or blackish; apical margins of segments, legs and antennæ testaceous; pubescence sparse and pale; head somewhat produced behind, very little narrowed; space between hind ocelli about twice as great as that between them and eyes; thorax indistinctly punctured; middle segment not ridged or roughened; first abdominal segment rather short and broad, distinctly, but not strongly punctured, other segments indistinctly punctured; wings subhyaline; nervures testaceous; stigma brown; marginal cell a little longer than half of stigma; third submarginal cell nearly quadrate, if anything, higher than long; second submarginal petiolate, much shorter than the third on the cubital nervure. Length 6 mm.

Arizona: Willcox, July 24th (Hubbard). One specimen in collection of U. S. National Museum.

17. **Brachycistis æqualis** n. sp.

♂.—Pale castaneous, clothed with sparse, whitish pubescence; antennæ paler; legs palest, tending to testaceous; head somewhat produced behind eyes, but scarcely narrowed; space between hind ocelli greater than that between them and eyes; thorax strongly punctured, the dorsulum and scutellum sparsely; mesosternum presenting two rather prominent convexities, which are more or less transversely striated as well as punctate, the striæ hardly evident in one example; middle segment roughened posteriorly, the upper and posterior surfaces separated by a sharp ridge, sulcus of upper surface broad; first abdominal segment short and broad, strongly punctured, barely as long as second segment; wings subhyaline; nervures and stigma brownish; marginal cell equalling the stigma in length; third submarginal much longer than high; second subtriangular about as long as third on cubital nervure; the first and second transverso-cubital veins widely separated above. Length 12-13 mm.

Colorado; Nevada; Arizona. Four specimens.

18. **Brachycistis triangularis** n. sp.

♂.—Pale castaneous, clothed with a tolerably dense, whitish pubescence; legs tending to testaceous; head a little produced behind, but not narrowed; space between hind ocelli greater than that between them and eyes; mesosternum with large, sparse punctures, the mesopleuræ with closer punctures; middle segment roughened behind, especially above, not ridged, the sulcus of upper surfaces

shallow; first segment short and broad, rather pyriform, strongly convex posteriorly and with strong punctures; wings subhyaline, nervures and stigma testaceous, the latter sometimes brown; marginal cell about equal to two-thirds the length of stigma; third submarginal higher than long; second triangular generally subpetiolate, almost equal to the length of the third on the cubital nervure. Length 9 mm.

Arizona. Four specimens.

19. **Brachycistis brevis** n. sp.

♂.—Pale castaneous, sparsely clothed with pale pubescence; antennæ and legs testaceous, the latter palest; head very little produced and not narrowed behind; space between hind ocelli greater than that between them and eyes; punctures of thorax large and sparse, closest on mesopleuræ, sparsest on dorsulum; upper and posterior surfaces of middle segment roughened at sides, and the portion dividing them also roughed, otherwise comparatively smooth, except in the sulcus of upper surface; abdomen with strong, scattered punctures; first segment short and broad, almost as wide at apex as base of second; wings subhyaline, nervures and stigma testaceous; marginal cell very short, barely equalling half of the stigma in length; two submarginals of nearly equal length, the second subpetiolate; second recurrent vein interstitial with the second transverso-cubital vein. Length 9 mm.

California. One specimen.

20. **Brachycistis perpunctatus** Ckll.

Brachycistis perpunctatus Cockerell, Tr. Am. Ent. Soc., xxii, p. 291, ♂, 1895.
Mutilla Belfragei Dalla Torre, Cat. Hym., viii, 15, 1897.

New Mexico: Las Cruces. This species is not at all similar to *Chyphotes Belfragei*, with which Dalla Torre has confused it in his "Catalogue."

The following two species are represented in the female sex only:

21. **Brachycistis rutilans** Blake.

Mutilla rutilans Blake, Tr. Am. Ent. Soc., vii, 248, ♀, 1879.

California.

22. **Brachycistis bimaculatus** n. sp.

♀.—Pale castaneous, sparsely clothed with short, pale pubescence; thorax above with a whitish, pale, not very dense pubescence; head and thorax finely punctured; legs paler than thorax; second dorsal with two widely separated, pale yellowish spots; second and third dorsals apically, and sixth medially fuscous, the latter yellow at base and apex. Length 4 mm.

Missouri: Ripley County (P. J. Schmitt). One specimen sent to me by Rev. R. Kraus.

MYRMOSA Latreille.

Of the four species at present described from the United States, only one is known in the female sex, *M. thoracica*, and there is little doubt but that this will prove to be the female of *M. unicolor*, as both inhabit precisely the same regions.

MALES.

Second submarginal cell triangular, smaller than third, the first and second transverso-cubital veins uniting above; head, thorax and abdomen coarsely punctured: first ventral abdominal segment with a hook at base, the second ventral unarmed; hind coxæ with a blunt tooth or lamellate process above.....**unicolor** Say.

Second submarginal cell elongate, larger than third, the first and second transverso-cubital veins widely separated above; body finely punctured; first ventral not hooked.....2.

2. Hind coxæ above with a distinct spine; insect black, at most with tip of abdomen reddish; third submarginal narrowed above, higher than long. **parvula** Fox.

Hind coxæ with a blunt tooth or lamellate process; head, thorax and legs black, abdomen ferruginous; third submarginal quadrate, longer than high.....**rufiventris** Blake.

FEMALES.

M. thoracica, the only American species known in the female sex, is coarsely punctured; ferruginous, with abdomen more or less blackish above; first segment transversely carinated above, beneath prominently produced at base; the front of head is usually blackish.

1. **Myrmosa unicolor** Say.

Myrmosa unicolor Say, Keating's Narrative Long's Expedition St. Peter's River, etc., ii, 331, ♂, 1824; LeConte's Ed. Say's Entom., i, 222, 1859.
Ischioceras rugosa Provancher, Nat. Can., xiii, 8, ♂ (not ♀), 1882.
Mutilla unicolor Dalla Torre, Cat. Hym., viii, 94, 1897.

Canada, southward to Virginia, thence westward to Colorado. Very variable in size. The base of second ventral segment may be tuberculate or not. I have Provancher's type of *Ischioceras rugosa* before me. It is identical with *M. unicolor*, save for an anomaly of venation, the second transverso-cubital vein being abbreviated and represented by a mere stump, which does not reach half-way to the marginal cell. The description by Provancher of the male probably applies to *Methoca stygia*.

2. **Myrmosa parvula** Fox.

Myrmosa parvula Fox, Journ. N. Y. Ent. Soc., 53, ♂, 1893.
Mutilla antisemitica Dalla Torre, Cat. Hym., viii, 10, 1897.

Illinois; Montana.

3. **Myrmosa rufiventris** Blake.

Myrmosa rufiventris Blake, Tr. Am. Ent. Soc., vii, 254, ♂, 1879.
Mutilla erythrogaster Dalla Torre, Cat. Hym., viii, 36, 1897.

Nevada. Only the unique type seen.

4. **Myrmosa thoracica** Blake.

Mutilla thoracica Blake, Tr. Am. Ent. Soc., xiii, 204, ♀, 1886.
Mutilla erythronota Dalla Torre, Cat. Hym., viii, 36, 1897.

Generally distributed, as *M. unicolor*.

MORSYMA* gen. nov.

Female apterous; eyes facetted; three distinct ocelli; thorax divided into three parts; legs graceful, not flattened; tibial spurs 1-2-2; claws simple; abdomen fusiform, not carinate, the first ventral unarmed; no pygidium; body strongly punctured. Male unknown.

1. **Morsyma Ashmeadii** n. sp.

♀.—Head and thorax and first segment ferruginous; abdomen, except first segment, legs and antennæ black; pubescence long and black, a whitish fringe at apex of second dorsal; head with large, separated punctures, wider than thorax; mandibles acute, armed with a tooth within before apex; thorax rugose above, punctured on sides, except on middle segment, the sides of which are smooth; abdomen finely punctured, except on second ventral, where the punctures are large and separated. Length 6 mm.

California: Napa County (Coquillet). One specimen in collection of the U. S. National Museum.

Morsyma differs from *Myrmosa* in the tripartite thorax, and while agreeing in that respect with *Methoca*, differs from it in the coarsely sculptured body, two-spurred medial tibiæ, etc. It is clearly related to both of these genera.

METHOCA Latreille.

Of the four species at present on our lists, *M. pacalis* Harris must be excluded, as it was never described; *M. canadensis* Smith is apparently synonymous with *M. stygia*; and *M. californicus* will probably turn out a variety of *M. bicolor*; the latter is very likely the female of *M. stygia*.

MALES.

Pubescence griseus; wings not clear.....**stygia** Say.
Pubescence black; wings somewhat shaded.....**nigrior** n. sp.

FEMALES.

Head black; remainder of insect castaneous in greater part.....**bicolor** Say.
Head concolorous with greater part of body, castaneous..**californica** Westw.

*Anagram of *Myrmosa*.

1. **Methoca stygia** Say.

? Mutilla (Methoca) pacilis Harris, Cat. Anim. Mass. Insect. p. 587, 1835 (no description).

Tengyra stygia Say, Bost. Journ. Nat. Hist., i, 299. ♂, 1836.

Methoca canadensis Smith, Cat. Hym. Brit. Mus., iii, 67. ♂, 1855.

Ischioceras rugosa Provancher, Nat. Can., xiii, 8, ♂ (excl. ♀), 1882.

Methoca stygia Blake, Tr. Am. Ent. Soc., xiii, 280, ♂, 1886.

Occurs from Canada to Virginia, westward to Montana and Nevada.

2. **Methoca nigrior** n. sp.

♂.—Deep black, shining; pubescence short and black: clypeus tuberculate medially; head with distinct punctures, those on vertex larger and more separated; antennæ stout (last joints missing); thorax with strong punctures, those on upper surface well separated; middle segment rugoso-reticulate, practically as in *M. stygia*. posterior surface transversely rugose; abdomen with tolerably distinct, sparse punctures, finer than in *stygia;* wings a little infuscated. Length 12½ mm.

State of Washington. One specimen. This is a much blacker insect than *M. stygia*, which has a grayish appearance.

3. **Methoca bicolor** Say.

Methoca bicolor Say, Bost. Journal Nat. Hist., i, 299, ♀, 1836; Blake, Tr. Am. Ent. Soc., xiii, 279, ♀, 1886.

I have only seen specimens from New Jersey (June and July) and Kansas, but have no doubt it is generally distributed as *M. stygia;* Provancher records it from Canada.

4. **Methoca californica** Westw.

Methoca californica Westwood, Tr. Ent. Soc. Lond., 1881, 133, ♀.

California. I am inclined to regard this as a variety of *bicolor* in the absence of California specimens. I have a New Jersey example, which I regard as *bicolor* var., which agrees perfectly with Westwood's description.

TELEPHOROMYIA Guérin.

This genus was described from Chile and Patagonia, and Ashmead recently records a species from California, which, while agreeing with most of Guérin's generic description, yet differs in having the claws supplied with a sharp median tooth internally, not with too teeth as in *Telephoromyia*. I am now inclined to regard my *Telephoromyia punicea* from Brazil, with cleft claws, as not representing *Telephoromyia*. It is certain that *punicea* and *anthracina* do not belong to the same genus.

1. **Telephormyia anthracina** Ashm.
Telephoromyia anthracina Ashmead, Psyche, 251, ♂, 1898.

California: Los Angeles; Washington. This is coal black, with the clypeus and inner orbits yellowish.

GLYTOMETOPA Ashmead.

Glytometopa is a representative of the true Thynninæ differing from *Myrmosa*, *Morayma* and *Methoca* by the broadly flattened legs. It closely resembles the figure of *Bradynobœnus Gayi*, given in Gay's Historia de Chili, but, according to the description of the latter, the number of joints of the labial and maxillary palpi is different. It is interesting to note, that while Spinola describes the thorax of *Bradynobœnus* as bipartite, the figure shows it to tripartite.

1. **Glytometopa americana** Ashm.
Glyptometopa americana Ashmead, Psyche, 251, ♀, 1898.

California: Alameda County.

ADDENDA.

[NOTE.—After the present paper had been so far printed as to not allow insertion iu their proper order, the following three species were found to have been omitted from the catalogue of species, although included in the synoptic table.]

89*a*. **Mutilla Foxi** Ckll.
Sphærophthalma Foxi Cockerell, Ent. News, v, 199, ♂, 1894.
Mutilla foxii Dalla Torre, Catal., viii, 41, 1897.

Mexico; New Mexico.

89*b*. **Mutilla fulvohirta** Cress.
Mutilla fulvohirta Cresson, Proc. Ent. Soc. Phila., iv, 433, ♂, 1865.
Sphærophthalma fulvohirta Blake, Tr. Am. Ent. Soc., xiii, 219, ♀, 1886.

Colorado; New Mexico.

89*c*. **Mutilla Townsendi** Ckll.
Sphærophthalma Townsendii Cockerell, Ent. News, v, 199, ♂, 1894.
Mutilla townsendii Dalla Torre, Catal., viii, 92, 1897.

Arizona; New Mexico.

149*a*. **Mutilla Ashmeadii** Fox.
Photopsis nanus Ashmead, (nec *Mutilla nana* Smith), Tr. Am. Ent. Soc., xxiii, 181, ♂, 1896.

Arizona: Tucson.

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Page 172, line 27, for wider than long *read* longer than wide.
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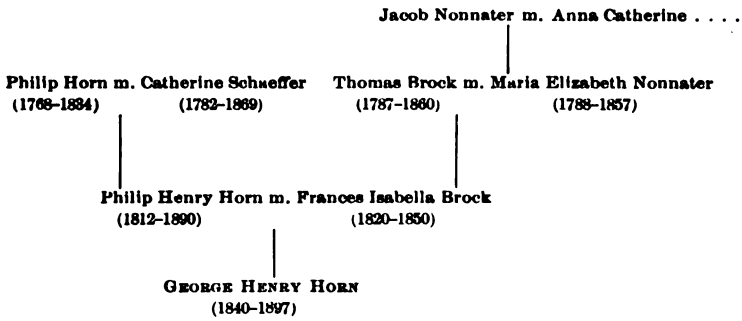
Yours truly
Leo Tolstoy.

A Biographical Notice of George Henry Horn.

BY PHILIP P. CALVERT.*

The preparation of a biography must necessarily be influenced by the attitude which its subject assumed toward biographical notices in general. A friend of Dr. Horn writes: "He told me once that Professor Cope agreed with him that the story of their lives, outside the printed record of their scientific work, could be well and sufficiently told in one hundred lines. He added that he told Cope that he would like to write his (Cope's) life and he said with considerable pride that Cope replied, 'Horn, I would trust you to do it.'" Horn himself contributed a notice[51] of his friend and teacher, Dr. LeConte, which fills five closely-printed octavo pages of small type. Those who have been associated with him in this Society may therefore feel justified, to a certain extent, by his own example, if the space, which they deem requisite to preserve a fitting record of his life and works, considerably exceeds the limits he thought necessary.

George Henry Horn, born in Philadelphia, April 7, 1840, was the oldest child of Philip Henry and Frances Isabella Horn. His descent may be most clearly shown by a diagram.



Philip Horn, Dr. Horn's paternal grandfather, was born in Steinbockenheim, about ten miles southeast of Kreutznach, in Rhenish

* See the note at the end of this notice for some explanations.

Prussia, December 15th, 1768. He came to America October 10th, 1798, and settled in Baltimore, Maryland, where he died November 15th, 1834. His wife, Catherine Schaeffer, was born in Carroll County, Maryland, April 17th, 1782, and died June 18th, 1869.

Their son, Philip Henry Horn, was born in Baltimore, December 25th, 1812. He came to Philadelphia about 1830, studied in the College of Pharmacy here, and established himself in the drug business, at the southwest corner of Fourth and Poplar Streets, until 1876, when he retired. The house and store which he built here was that in which his son, George Henry, was born. He was elected President of the Northern Liberties Gas Company, and was a director in various corporations until his death in 1890. He was an active member and church officer in the German Reformed Church on Race Street below Fourth until the Church was sold, when he united with the Reformed Church at Seventh and Spring Garden Streets.

Dr. Horn's maternal grandfather, Thomas Brock, was born in New York City, in 1787, of English Episcopalian parents. His mother died when he was quite young, and was buried in Trinity Church-yard, New York, after which his father removed to Toronto, Canada. In his early manhood Thomas Brock returned to New York, where he learned the trade of stone-cutter. Subsequently he came to Philadelphia, but he retired from business many years previous to his death here in May, 1860. He served in the war of 1812 on the American side. His wife, Maria Elizabeth Nonnater, was born in Philadelphia, at the southwest corner of Tenth and Arch Streets, in 1788, and died in the same city in October, 1857. She was the daughter of Jacob and Anna Catherine Nonnater, who came from Germany before the Revolutionary War and settled in Philadelphia. Jacob Nonnater took the oath of allegiance to the United States. His two sons, Stephen and Jacob, served in the war of 1812, and were highly respected citizens. All belonged to the German Reformed Church on Race Street below Fourth.

The daughter of Thomas Brock and Maria Elizabeth Nonnater, Frances Isabella Brock, also a communicant member of the same church, was born in Philadelphia, January 13th, 1820. She was of delicate health and died at the age of thirty years. Four children were the issue of her marriage to Philip Henry Horn, George Henry, the subject of this notice, and three girls, one of whom died at twenty-seven years, one at fifty-two, and one who survives her

brother. Philip Henry Horn had also, by a second marriage, a son and a daughter.

'While George Henry Horn could not be called a sickly child,' his sister writes, 'he was not robust, and his fair hair and complexion rather gave him a delicate appearance. His very early education was begun in a small private school, about which I am not familiar. After that he went to the Jefferson [public] school at Fifth and Poplar Streets.'

In July, 1853, he entered the Central High School, then located on the east side of Juniper Street, below Market, facing Penn Square, but transferred, in the summer of 1854, to the southeast corner of Broad and Green Streets. The curriculum of those days included history, logic, rhetoric, elocution, English, Anglo-Saxon, Latin, French, German (abandoned for some years after September, 1856), geometry, trigonometry, surveying, navigation, astronomy, chemistry, physics, anatomy, physiology, natural history, moral science, political economy, drawing, writing, book-keeping and phonography. An elective system of studies was in vogue, making it possible for students to exercise a choice of courses to be followed. The Principal of the School was John S. Hart, and among the faculty were E. Otis Kendall, Henry McMurtrie, M.D., William and Edward W. Vogdes, Francis A. Bregy, James McClune and Rembrandt Peale. George Henry Horn was graduated from the School February 11th, 1858, with the degree of Bachelor of Arts. Among his classmates were John G. Johnson, our well-known lawyer, William H. Samuel, a Government Reporter in the military department, 1862-65, and author of poems, and the Rev. Henry Palethorp Hay, D.D., LL.D.

Soon after leaving the High School he matriculated in the Medical Department of the University of Pennsylvania, from which he received the degree of Doctor of Medicine, March 14th, 1861. His diploma bears the signatures of D. R. Goodwin Provost, John F. Frazar Vice-Provost, Caldwell K. Biddle Secretary, and of the Professors—William Pepper, Sr., Theory and Practice of Medicine, Joseph Leidy Anatomy, Henry H. Smith Surgery, Hugo S. Hodge Obstetrics, Samuel Jackson Institutes of Medicine, Joseph Carson Materia Medica and Pharmacology, and Robert G. Rogers Chemistry. His medical thesis was on 'Sprains.'

Of this period of his life his sister writes: 'I do not know of any honors gained by him either while at school, or in the University, and I think that his habit of observation made him in many things

self-taught. I believe that his close application to study from boyhood on through life was very detrimental to his (not overly robust) health, but he loved study and research and seemed to be ever grasping for something new, and as a boy, while the sports of boyhood attracted others, he was experimenting or studying, taxing both brain and body.'

No inherited taste for natural sciences is known to exist in Horn's case. His sister 'has no idea, whatever, what prompted his scientific turn—my impression is that it was innate.' Near the close of his life, on March 28th, 1895, in announcing, to the Entomological Section of the Academy of Natural Sciences of Philadelphia, the death of Dr. W. S. W. Ruschenberger, he 'reviewed the early work of the latter, principally the issuing of a science primer, which the speaker had known to be the direct means of interesting more than one person in the study of natural history; in fact, gave the speaker his first insight into Entomology.'* This probably refers to a compilation by Ruschenberger entitled, "Elements of Natural History, embracing Zoology, Botany and Geology," published at Philadelphia in 1850.

Horn's work in Zoology began while he was yet a student in the Medical School, and like that of his contemporaries Cope, Harrison Allen, H. C. Wood and others, took its visible origin from the Academy of Natural Sciences of his native city. Owing probably to the influence of his friend, William M. Gabb, later State Paleontologist of California, his attention was directed at first to the Cœlenterates and the Bryozoa. His first scientific paper, "Descriptions of three new species of Gorgonidæ, in the collection of the Academy," presented at its meeting of June 19th, 1860, and published on page 233 of the Proceedings for that year, occupies hardly more than half a page. In "Descriptions of new Cretaceous Corals from New Jersey" by Wm. M. Gabb and Geo. H. Horn, page 366 of the same, hardly one page long, seven new species are characterized. Then followed "On Milne-Edwards' Synonymy of *Xiphigorgia setacea*" p. 367–368, and "Description of new Corals in the Museum of the Academy" p. 435 (five new species), presented October 2d, 1860. A "Monograph of the Fossil Polyzoa of the Secondary and Tertiary Formations of North America" by Wm. M. Gabb and G. H. Horn, M.D., published in the Journal of the Academy, volume v, part ii, pages 111–179, and dated July, 1862, apparently terminates Horn's work on the lower Invertebrates.

* "Entomological News," vi, p. 166.

The Entomological Society of Philadelphia, founded by Ezra T. Cresson, James Ridings and George Newman, had been organized February 22d, 1859, and of this association Horn became a member July 23d, 1860. Dr. John L. LeConte, then the foremost American coleopterologist, had been one of the organization members, but Horn, although frequently and not incorrectly styled the pupil of LeConte, does not appear to have made LeConte's personal acquaintance until after his own work on insects had begun. Mr. Charles Liebeck states that Dr. Horn once told him that the occasion of his first meeting with LeConte was the publication by Horn[5] of the description of *Margarinotus guttifer;* this attracted LeConte's attention, caused him to seek out Horn, and so the foundation of their long friendship was laid. The first fruits of Horn's connection with the Entomological Society soon appeared in "Descriptions of new North American Coleoptera, in the Cabinet of the Entomological Society of Philadelphia" presented to the Academy of Natural Sciences December 18th, 1860, and published in the Proceedings for that year, pp. 569–571. This, his first entomological paper, describes seven new forms, the first being *Nomaretus imperfectus* from Hampshire County, Virginia.

In the meantime the Civil War had broken out. On the ninth of June, 1862, he resigned as a member of the standing committee of the Society on Coleoptera, to which he had been elected December 9th, 1861, and went to California. Under date of February 26th, 1863, he was commissioned, by Governor Leland Stanford, Assistant Surgeon in the Second Cavalry, California Volunteers, and took the oath of allegiance at Camp Independence, Owen's Valley, California, March 1st, 1863. On July 14th, 1864, he became surgeon of the First Infantry Regiment, California Volunteers, "remaining in that position until the term of service of the regiment expired, December 3rd, 1864." Under date of May 18th, 1865, he was commissioned Assistant Surgeon, with rank of First Lieutenant, in the Second Cavalry again, and took the oath at San Francisco, May 22nd. August 26th, 1865, his commission as Surgeon in the Second Infantry Regiment, California Volunteers, with rank of Major, was signed by the Governor, and subscribed to by Horn at San Francisco, September 23d, 1865. "His service terminated with that of the staff of his regiment April 16th, 1866."

These years in the West gave him many opportunities for the collecting and observing of insects, and allusions thereto occur in a

number of his later writings. The Proceedings of the Entomological Society of Philadelphia record the reception of a letter written from Camp Independence, July 1, 1863, giving an account of his researches on insects in that region.

He tells us elsewhere[8]: "I went to North-eastern California, near the head waters of Pit River—a tributary of the upper Sacramento. Near Fort Crook I saw the first living specimens [of *Amphizoa insolens*], though so rare and difficult to be obtained, that I was satisfied with the securing of a few specimens, without risking the loss of any in the observation of their habits. From Fort Crook I went to Surprise Valley, on the boundary line between California and Nevada. Here I found them very abundant, as well as on the western slope of the Sierras, in the creeks forming the three head branches of Pit River." Other places he mentions as having visited are Yuma, Gila Bend, Maricopa desert, Temescal and Fort Grant, in Arizona.

He returned to Philadelphia in 1866, was elected President of the Entomological Society December 10th, and, on December 26th, presented to the Academy the first of his results "accumulated during a four years' residence in California and the adjoining territories."[9] The long series of papers on the Coleoptera, destined to appear for nearly thirty successive years, was thus begun, while at the same time he commenced to build up a growing and successful practice in medicine, more especially in obstetrics. A note-book, in his own handwriting, entitled, "Obstetric Memoranda," records the cases he attended at a later period, and it may be of interest to quote the totals for each year to indicate the extent of his practice: 1879 28, 1880 31. 1881 37, 1882 26, 1883 31, 1884 33, 1885 58, 1886 55, 1887 20 in the first six months, and then the record ends.

In the Spring and Summer of 1874 he paid a visit to Europe, was at the meeting of the Entomological Society of London on June 1st, examined the collections of the British Museum, spent considerable time in Paris, where he is recorded as having attended the meetings of the Entomological Society of France on July 8th and 22d, August 26th and September 9th, and made the acquaintance of many European entomologists.

A second and a third visit to Europe were made in the summers of 1882 and of 1888 respectively. In the former year he was with Westwood in Oxford, and Dr. David Sharp in Scotland; in Paris, where his name appears in the minutes of the Entomological Society

as present at the meetings of June 14th and July 26th, in Heidelberg, in Stettin at the Entomologisches Verein on June 22d, and in Berlin. Of the last visit he wrote, on October 9th, 1888, "I arrived home safely September 30th after a very pleasant visit to my friends in Europe. About the middle of July I went to Stettin and spent several days with Dr. Dohrn . . . . In the Berlin Museum they were very kind to me and I had good chance to study the types of Erichson. I can safely say that I have now seen more genera of Melolonthide Scarabæids than any other person." This year his appearance at the "seances" of the Society in Paris on June 27th and August 8th was in his capacity as an Honorary Member.

The minutes of the Board of Trustees of the University of Pennsylvania in Philadelphia, for November, 1889, record that a communication was received from the Faculty of Biology, recommending the establishment of a Professorship of Entomology and suggesting Dr. Horn as incumbent. The recommendation was adopted and an election set for the next meeting of the Board. Accordingly, Dr. Horn was elected Professor of Entomology, December 3d, 1889, and his acceptance is recorded in the minutes for January 7th, 1890, along with that of Edward D. Cope, who had just been elected to the chair of Mineralogy and Geology. Dr. Horn never gave any instruction under this election, although for some years the announcement in the University Catalogues read "Biology 21. Entomology. The General Anatomy of Insects, with Practical Exercises in Systematic Coleopterology." Subsequent to his death the Trustees adopted a minute suitable thereto.

In the Spring of 1893, Dr. Horn revisited California, and was introduced at the meeting of the California Academy of Sciences at San Francisco, May 1st.

In 1895 he began to experience considerable difficulty with his hearing, and his friends noted, with pain, other signs of increasing feebleness. October 26th, 1896, saw him for the last time at our entomological meetings, although he continued to visit the rooms of the Columbia Club, a social organization, of which he was a member. While engaged in a game of cards here on December 26th, 1896, he was stricken with paralysis of the left side, although he did not entirely lose consciousness. He was removed to the house of his half-brother, at 942 Franklin Street, where he had resided for a number of years, and received the best of medical attention and careful nursing. He recovered sufficiently to converse with his

friends, to read, write and smoke, but he appreciated the fact that his working days were over. In May, 1897, he removed to a fishing-club house at Beesley's Point, New Jersey, and spent much of the Summer out of doors. In November he came to Philadelphia to attend a reception by the American Philosophical Society to Fridthof Nansen, and soon after returned to the Jersey coast. He had invited a few friends to spend Thanksgiving day, November 25th, with him, when the end came suddenly and unexpectedly on November 24th. The funeral, on November 27th, at the house on Franklin Street, Philadelphia, was attended by many friends and representatives of the associations of which he was a member, and the Rev. Dr. Henry C. McCook delivered an eloquent and appropriate address. His body was buried in his father's lot in Central Laurel Hill Cemetery.

In considering Horn's work reference must be made to his relation to LeConte. Horn wrote of him [151]: "We all knew him as a cultured scholar, a refined gentleman, a genial companion, a true friend. To me he was more. For nearly twenty-five years our association has been of the most intimate nature. I sought his advice and instruction as a neophyte in entomology, finding a welcome which I had no reason to expect.* Our friendship ripened to an intimacy never shadowed by the slightest cloud."

Some of the following pages will describe their association in work, and the contrast which the two men presented. A foot-note to LeConte's last paper, "Short Studies of North American Coleoptera No. 2" (Transactions Am. Ent. Soc. xii) states that the manuscript, left in a fragmentary condition by the author at his death,—LeConte died November 15th, 1883,—was completed by G. H. Horn. LeConte's collection was bequeathed to the Museum of Comparative Zoology at Harvard College, and of this Horn wrote [759]: "Some months after the death of Dr. LeConte I considered it a duty to assist in fulfilling his will by suitably preparing his cabinet and transporting it to the Museum at Cambridge. Annually since I have made one or two visits for the more accurate study of its types after a thorough study of my own material had been completed. In that collection I find not only the bare facts, for which I seek, but much besides. In the more than thirty years of our association there is not a box which has not been before us the topic of discus-

* The original has "except"—surely an oversight in proof-reading.

sion or for consultation. Every one recalls its memories, and even particular specimens recall incidents of interest. To me such a visit is, therefore, more than the comparison of specimens, it puts me again in touch with a friend. . . . I regret greatly that many of the traditions of the collection are known only to me. Frequently specimens have something about them indicating their origin, and types from Chaudoir, Mannerheim and others, even including Dejean, may be known thereby. As many of these traditions concern individual specimens it is hardly possible to give any general data. In a collection of the character of that of LeConte it is important that no label attached to a pin, however unimportant it may seem, should be removed."

We will not attempt to consider Dr. Horn's published entomological writings in detail. The accompanying bibliography by one of his intimate friends, Mr. Samuel Henshaw, furnishes a list believed to be complete. By far the greater number of them deal with the Coleopterous fauna of America north of Mexico, but a few treat of that of Central America and Mexico. The majority, moreover, are written from the monographic, systematic standpoint. They are estimated by Prof. Smith to contain studies and actual characterizations of by far the greatest number of the 1900 genera accredited to North America, including 154 proposed as new, and descriptions of more than half of the 11,000 species (1582 new).

We cannot do more than endeavor to indicate those papers which, in the judgment of Coleopterologists, are the most important. Mr. Henshaw writes: "I consider his papers on the Carabidæ[128] (1881) and Silphidæ[112] (1880) among the most valuable. It is hard to pick out a few when nearly all have a uniform standard of excellence. His Philonthii[155] (1884), Chlæniini[72] (1876), Dasyllidæ[107] (1880), Chrysobothris[182] (1886), and Aphodiini[190] (1887) show some of his best work."

Prof. Smith has expressed himself similarly: "When so much is excellent it is difficult to assign comparative rank to the published work; but perhaps that on the genera of Carabidæ, 1881, may be considered the best. It was certainly in some respects the most thorough, the most revolutionary and the most convincing; for his conclusions have secured practically universal acceptance. His work on the Silphidæ in 1880 while not so brilliant, was even a greater tax on his powers, and I am not certain that he did not himself feel most proud of this."

Certain it is that it was the paper on the Carabidæ that called forth the most extended notices. In the Transactions of the Entomological Society of London for April, 1882, Mr. (now Dr.) David Sharp reviewed and criticized it. As important discoveries and improvements in the classification made by Dr. Horn, Mr. Sharp considered the adoption of three subfamilies, viz., Carabinæ, Harpalinæ and Pseudomorphinæ, instead of two, viz., Carabinæ and Harpalinæ, as had been heretofore done; that the structure of the second coxal cavities of *Mormolyce* is as in the Dytiscidæ; and the separation of the Haliplini and *Pelobius* from the Dytiscidæ. On the other hand, the placing of *Mormolyce* with the Harpalinæ, in view of Dr. Horn's own discovery, appeared to the reviewer very strange and indicated that "the talented American" had not "the courage of his convictions, or rather of his discovery," to isolate "*Mormolyce* in his classification, as it is in nature." The opinion was expressed that the number of tribes of the Carabidæ would be much increased by more extended studies of extra-North American forms, and that such studies would also show the necessity of modifying Horn's statements as to the structure of skeletal parts, as the method relied upon by him—maceration in caustic potash—appeared to be "a very unsafe proceeding." Finally, the reviewer dissented at length from the statement that the structure of the Gyrinidæ seems "to be so plainly adephagous as to leave no room for doubt." The concluding paragraph reads "I must not pass from the consideration of Dr. Horn's paper without making some apology for the rather critical nature of my remarks, but this is scarcely necessary, for we all know that he is one of the most unprejudiced admirers of truth and accuracy, and I am convinced that he will no more be likely to find fault with me for discussing some of his conclusions than the lamented Chaudoir would have been to disagree with him because of his criticisms; but I cannot conclude without pointing out that, although we are still far from possessing a perfect classification of the carnivorous Coleoptera, yet Dr. Horn's paper shows that we are on the right road for getting one; and his contribution will undoubtedly prove to be a considerable assistance to those who, like himself, will have the courage and perseverance to aid research in this direction Such a large amount of original observation as is recorded in the definitions of the tribes and remarks on the subordinate groups and in the six plates closely filled with drawings of the trophi, cannot but be most useful to future systematists, and we may give our hearty thanks to Dr. Horn for the work he has accomplished."

Both the "Synopsis of the Silphidæ" and the "Genera of Carabidæ" were reviewed by Dr. C. A. Dohrn in the Stettiner Entomologische Zeitung. Of the latter he wrote in 1882: "Few among living and working Coleopterologists can boast of uniting so many favorable qualifications for this work in their own persons as the author. From his place of birth and from his intimacy with the 'Altmeister,' Dr. John LeConte, he is, like the latter, completely at home in the North American beetle fauna; his visit to Europe, his acquaintance with foreign languages, his correspondence—have enabled him to deal intelligently with the views of others on the subject in hand; his 'coleopterographic' authority within and without his own country is so firmly founded as not to expose him to the temptation of wishing to attract attention by paradoxes. Self-evidently I content myself with reviewing Horn's work by extracts. . . . From this, and from the succeeding chapter, I select in order to show our readers (as I hope) how deeply and thoroughly the author has comprehended his subject and how conscientiously he has proved and tested the ideas of his predecessors." Nine and a half pages of quotations sufficed, in Dohrn's view, to show how profoundly Horn "had grasped his subject, and how carefully he had executed it. Whether any one of the few who, with similar inclination and perseverance, have devoted themselves to the classification of the overwhelming numbers of the Carabidæ, may be in position to offer valid objections to the author, the future will teach. In the mean time I must content myself with directing the attention of our readers to this highly meritorious, able work. Perhaps some of these, who see the systematic value which Dr. Horn lays upon the 'supraorbital setæ,' will recall the thoughtful remarks of Brunner v. Wattenwyl on Classification where he speaks of the 'preservation of indifferent organs in changes of form.' (Jahrg. 1881, p. 232)."

But the most enthusiastic notice of the Carabid paper was that by A. Preudhomme de Borre, at that time Conservator of the Musée Royale d'Histoire Naturelle at Ixelles, a suburb of Brussels, read the fourth of March, 1882, at the meeting of the Belgian Entomological Society. It began "At the end of the year 1881 there arrived from America an extremely remarkable work which, we think, will place its author, M. G. H. Horn, among the number of masters of present Entomology. Under a modest title of such nature as to make us wrongly believe that the work is written as one of those local faunal studies which too often absorb our confréres in the United States,

this memoir gives us a complete systematization of the Carabids, which is assuredly the best yet produced on this subject, and which appears to us to merit adoption by all museums and collections, without pausing, perhaps, at some doubtful points of detail—a thing inevitable in such a work, man not being infallible." A dozen pages of extract and technical comment succeed. Then a last one shows more clearly, perhaps, than any of our other citations the impression the work made upon a working Coleopterologist of the time. "The work of M. Horn is much more developed than this synopsis which I have extracted and which is its substance. The characters of each tribe are also given with much elaboration, as well as indications of the American, and often other, genera that the author refers to them with the reasons for so doing. Many of the genera take places quite different from those in which we are accustomed to see them. In the arrangement of the tribes we have already seen that some affinities consecrated by an almost general usage are entirely broken. I ought to say with justice, for all those who have looked into the subject know it, that in our classification there were only too many traces of the pitiable study that may be called parish entomology, that is, that the first authors were directed by an insupportable prejudice that our little Europe was to furnish the exact abridgment of the nature of the globe and the possibility of formulating the system of that nature by it alone. To return to the genera, it is probable that there are some points in their arrangement to be contested. The author, on his side, has perhaps not quite thoroughly studied everything that was not at his own door. He has, nevertheless, treated his subject with a breadth of vision which we do not always find in American authors, who also absorb themselves too much in these territorial studies of which I have spoken, studies which, moreover, bear on a territory vaster than our little Europe. But if some traces of this Americanism are found in M. Horn's work, they are quite involuntary I think, and everywhere one reads between the lines the desire to observe, to know, and to regulate for the entire planet. All that is wanting to this work perhaps is to have been preceded by some months' study in the public and private collections of the Old World,* where may be found some scientific treasures which the dollars of the New have not yet transported beyond the Atlantic. Still a word, a word of lively approbation. For how

* This remark seems to indicate that M. de Borre did not know of Horn's visit to Europe in 1874.

many others would not such a work have been the occasion to change the names and to resurrect some forgotten dead, to render the synonymy more and more difficult. M. Horn, like his compatriots generally and the English, shows himself a man of practical sense. His names are, above all, those consecrated by usage, by the authority of the classic monographs, by the authors of great descriptive works who have something else to do than to search for questions of 'anteriority,' to seek if the name consecrated by all the great authors had not been preceded, perhaps by a month, by some other fallen in the dust. For this we congratulate him warmly."

The most general work in whose production Dr. Horn was concerned was the 'Classification of the Coleoptera of North America' [142] (1883). An analysis of it is given by Dr. Scudder in his biographical notice of Dr. LeConte,* and it has been characterized by Prof. Smith as representing the ripe experience of Dr. LeConte, the broader student of nature, and the critical and accurate knowledge of technical detail characteristic of Dr. Horn.

Two notices of this work are perhaps less familiar, to American readers at least, and we venture to quote from them. One of these was by Dr. Dohrn in the Stettiner Zeitung for 1884. Like his notice of Horn's Carabid paper, it consists in the main of translated extracts, but his concluding paragraph is directly concerned with our present subject: "After this introduction, which comprehends the entire domain of the classification of known beetles, the authors treat only of the families living in North America. Needless to say that Dr. G. Horn was eminently fitted for this work, for upon his younger shoulders had the older master, in the course of his later and disease-stricken years, transferred the greater and heavier part of the tiresome labor. I repeat that Dr. Horn's approved pen has furnished a work which could be written only by one having access to rich and extensive material, and whose iron industry and inborn talent enabled him to marshal this material and make use of it in a brilliantly scientific manner. Since the overwhelming majority of the genera of beetles occurring in North America are represented also in the Old World, it is self-evident that the present volume is to be strongly recommended to the close study of all 'Coleopterophiles.'"

The second notice of the 'Classification' to which we have re-

* Proceedings of the National Academy of Sciences, 1884; Transactions of the American Entomological Society vol. xi.

ferred is that by the Rev. A. Matthews, known for his researches on the Trichopterygidæ. "European entomologists are often impressed with the idea that their scientific brethren on the other side of the Atlantic are so embarrassed with the riches of their own fauna that they are comparatively unacquainted with the productions of the eastern hemisphere. But such a notice indicates a very imperfect comprehension of American intellect and American resources. No reason can be given to prove that a species inhabiting any part of the Old World should not be as well known in Philadelphia as in London, Paris, or Berlin; and much less is there any reason to suppose that American entomologists are not, at the very least, as well able to appreciate its affinities as the most erudite of their European contemporaries. . . . In such a state of things [favorite but antiquated systems] a revision of our systematic classification was imperatively called for; and this work has been inaugurated by the recent publication of the 'Classification of the Coleoptera of North America,' by Dr. LeConte and Dr. Horn.' . . : . the comprehensive lines on which it has been constructed will include (with, it may be, trifling modifications) the Coleoptera of both sides of the world. . . . "The basis on which the system is founded, that of the entire external skeleton, is more consonant with the general scope of systematic arrangement in the higher classes of the animal kingdom, and much less liable to error than the tarsal or any other system which rests upon special organs alone. It is a system which only requires careful study to ensure approval; it has conferred a lasting benefit on science and much honor upon its authors. To assert that it is perfect would be to assert more than man can accomplish. It is at the least a long step in the right direction, and opens a path which must lead to further important results." (Annals and Magazine of Natural History, London, September, 1883).

An examination of Mr. Henshaw's Bibliography will show that by far the greater number of the papers listed appeared in the Transactions of the American Entomological Society. Unquestionably, this was the journal in which Dr. Horn took the greatest pride and interest, and for many years he served upon the Publication Committee having it in charge. His preference was the more marked from the circumstance that since 1866 nothing from his pen, other than annual reports, appears in the Proceedings of the Academy of Natural Sciences, although he was Corresponding Secretary and a member of the Publication and Finance Committees of this latter

institution for many years. Other papers are contained in the Proceedings of the American Philosophical Society, of which, also, he was a Secretary and Librarian at the time of his death.

In the latter part of 1889, when the Entomological Section of the Academy of Natural Sciences and the American Entomological Society decided to establish a monthly journal devoted to their specialty, the weight of Dr. Horn's authority was naturally desired to aid the new enterprise. His name consequently appeared on the cover of the first number of "Entomological News" (January, 1890) and the contents included a short synonymical article on *Cryptohypnus* from his pen. Later issues contained short papers on variation, as that on "Trichodes ornatus Say" (Jan'y, 1891), which was evidently intended as a warning to those disposed to rush into print with descriptions of new species based on color differences, and those on variations in *Cicindela* (Feb'ry, 1892), to which we shall again refer, in *Dorcus* (April, 1892), and in *Amblychila* (November, 1893). Each of the first seven volumes contains some brief contributions from him, and the proceedings of the Entomological Section and Society published therein afford glimpses of his entomological studies from month to month. Finally, the "News" contains what seems to be his very last Coleopterological note—of six lines only—dealing with the synonymy of some North American Buprestids, and which appeared in October, 1896.

In describing the relations of LeConte and Horn Prof. Smith says: "At first there was some friction between him and the younger man, who was very positive in many cases where the older, more experienced student was inclined to be conservative. . . . Dr. LeConte was by all odds the broader man; his knowledge of nature at large was much wider, and he saw his speciality, the Coleoptera, much more truly in their relation to the other orders of insects, and this class in its relations to the rest of the animal kingdom. Dr. Horn was much more completely a specialist, with little interest outside the Coleoptera, but in this knowledge of detail was infinitely greater." These characteristics, and especially the latter, he retained throughout life. Little of general interest to the zoologist is to be found in his writings. Upon some few general topics, nevertheless, he did touch, and to his statements on these we shall devote some space. Prof. Smith is probably correct in stating that "His monographic and revisional papers are almost all built with the evolutionary idea constantly in mind" (Science).

In treating of Dr. Horn's connection with the journal "Entomological News" we have mentioned a number of short papers which he published therein concerned with variation in Coleoptera. From the most important of these, published in February, 1892, dealing with Cicindela [237] we extract: "Recently the subject of variation in coloration has been discussed before the Society of American Naturalists with the view of eliciting an expression as to whether color variation proceeded in a regular course, or was hap-hazard and accidental. My observations have been that variation proceeds in regular lines, easily demonstrable with sufficient material, produced by external influences which are at present but partly understood. There is probably no branch of zoology better fitted to illustrate this point than Entomology, from the abundance of species and the frequent occurrence of genera with large numbers of species in which a greater or less similarity of marking is observable." After showing the various lines along which color variations on the elytra exist, illustrated by a plate, he refrains, with his usual caution, from any speculations suggested by these facts, as follows: "In view of all the facts here presented the question might be asked, why do some species vary while others do not? While this matter is worthy of some thought, it is not possible to give a satisfactory answer. Some species doubtless vary from climatic causes. A notable instance will be seen in *hæmorrhagica*, which extends from San Diego and Yuma in California northwards to the headwaters of the Yellowstone, passing through about all possible varieties of climate and habitat, from sea-coast to mountain. On the other hand *hirticollis* occurs from Hudson's Bay to Arizona without variation, and the specimens of *lepida* from the New Jersey shore are not separable from those found in Nebraska. It seems hardly possible to make any generalizations on the subject. Doubtless the coast species vary to a greater extent taking them collectively than do the inland species, but it is impossible to go further in speculation as too many exceptions arise on all sides." Doubtless the conclusion which most appealed to him was that which he expressed in his closing sentence: "Should the method of thought which gave rise to the preceding remarks produce in some others thoughts as to the possibilities of variation, not only in color, but almost equally in form and sculpture there would be less synonymy to be corrected and a more truly scientific basis established for species." This paper has been reprinted in part by Prof. Cope, in his 'Primary Factors of Organic

Evolution' (Chicago, 1896), as evidence that variations of specific characters "are of certain kinds or in certain directions."

As early as 1868, in a brief communication,[18] "The importance of large series of this [*Amphizoa*] and other genera was urged on all who have collections, as the only means of arriving at a knowledge as to what constitutes a species." And in his Revision of Lachnosterna[193] p. 209, he remarks, "As it is never profitable to describe isolated species in troublesome genera, it was better to accumulate as large series as possible in order to determine the limits of variation, and thereby fix the value of many described from uniques." Nevertheless, it is quite true that many of his specific descriptions are based upon a single specimen. On the other hand, Prof. Smith's subsequent studies on this very *Lachnosterna*, published in Horn's lifetime, showed that Horn had united, as one species, several forms structurally distinct.

His habitual refrain from generalizing was shown even in his young manhood for, referring to the discovery of a species of *Pseudomorpha* in California, he remarks[12] that it "adds another fact to the already inexplicable law of distribution of genera in Australia, South America and California."

At the meeting of the Entomological Section January 10th, 1879, "Dr. Horn exhibited two Lepidopterous insects from Costa Rica of widely separated affinities, showing between themselves a really wonderful mimicry, not only in color, but also in form; so close, indeed, was the resemblance that either might have been placed among a number of specimens of the other, and without a careful glance, would not be thought distinct. The one was a *Heliconia*, the other a *Callimorpha*. The group to which the former belongs is rarely or never attacked by birds, and the mimicry belongs to the 'protective' class. In regard to matters of 'mimicry' so called, Dr. Horn thought the idea had been and is pushed too far. Many cases of this kind should be considered Nature's reproduction of an idea, so to speak, which had been developed elsewhere, and that such instances do occur among the myriads of insects is not very remarkable. Instances of equally wonderful 'mimicry' could be cited among Coleoptera where it is not protective or anything else than a mere close resemblance, for example *Amphizoa*, from California, and *Nyctipetus*, from South America."[93]

He did not fail to perceive the importance of studying the early stages of beetles, and at the meeting of the Entomological Society

of Philadelphia March 11, 1861, "called the attention of the members to the necessity of collecting the larvæ of insects, as the study of that portion of Entomology was of vast importance to the scientific world" (Proc. Ent. Soc. Phila., i, p. 2.). Twenty-seven years later he wrote:[193] "The larvæ of Coleoptera will doubtless yield facts of taxonomic value, and may aid in settling disputed relationships among the imagines. . . . At present too little attention seems to be paid to study of this sort, and every student of classification should consider it a duty to describe any authentic larva known to him with such figures of form and detail as may be useful hereafter."

A remark bearing on the inheritance of acquired characters occurs in a passage treating of the absence of the tarsi in the fossorial *Ateuchus*, *Deltochilum* and *Phanæus*: "It is evident that some other cause than inherited mutilation must be sought for to explain the loss of the tarsi in these insects."[214a]

Dr. Horn was disinclined to long and continued argument. From remarks which he made at times in conversation, he was evidently influenced in this regard by the example of Henry Walter Bates, the naturalist of the Amazons, whom he knew and esteemed highly. His attitude is expressed in his own words in a brief statement concerning the anomalous Lower Californian Coleopter *Vesperoctenus flohri*: "I do not propose to continue any argument, having said all that I deem necessary on my own part, and will leave to others the adoption of either view."[254] And again, "No literary work is more distasteful to me than controversy, especially when there is a personal element."[218] Yet he did engage in argument when he believed that one side of a case had not received its due, or that some principle, other than the scientific issue, was concerned. His papers on *Vesperoctenus* and *Pleocoma*[196] are examples of the first of these beliefs, the privately-published "Reply to Dr. C. V. Riley"[218] illustrates the second. The prefatory remarks to the last-mentioned give another glimpse of his character in the words: "In publishing my reply to Dr. Riley privately I wish to express my disapproval of the use of the pages of scientific periodicals for the ventilation of personal grievances to the exclusion of more useful matter."

One charge brought against him, however, never failed to arouse his resentment, and this also he has expressed in the paper on *Vesperoctenus*: "My principal object in writing these lines is to object to a method of argument on Mr. Gahan's part, and it is not the first time that the method has been used by my English friends in argu-

ment against myself and Dr. LeConte. It is the assumption that we have no collections for reference beyond our own species." Even such well-disposed critics as Dr. Sharp and M. de Borre had suggested as much in their above-quoted notices of the Carabid paper, so that the distinct denials of any such prejudices made by the Rev. Mr. Matthews (in the Review of the 'Classification') and Dr. Dohrn (notice of the Silphid paper) must have been welcome reading to the subject of this biography.

We have already quoted the opinions of two well-known American Coleopterologists—Mr. Samuel Henshaw and Prof. John B. Smith—on Dr. Horn's work, and both of these have already published some notices on the same subject. From letters with which two English authorities have kindly favored us, we are glad to quote.

Dr. David Sharp writes from the University Museum of Zoology, Cambridge, England, Jan. 24th, 1898, "The chief difficulty we entomologists have to contend with in comparison with the students of other branches of Zoology is the enormous number of specific forms that have to be examined previous to the establishment of any trustworthy generalisations. Dr. Horn did a great deal of that sort of work in a satisfactory if not final manner. The difficulty mentioned above leads inevitably to the study of entomology by faunal limits. Dr. LeConte's work—genius as he was—was limited almost absolutely in that manner, but Horn perceiving the discrepancies that were thus created, and also the evils of incompatible classifications in a single group set to work to gain a knowledge of the extra-American forms, and as a result he did good work of a general character by combining the classifications existing in America with those in vogue in Europe, and as a result producing papers of a wide general value, such as that on the Adephaga, and that on the Silphidæ. Add to this that he felt a genuine and natural interest in his work, and was therefore master of the patience indispensable for any satisfactory study in entomology, and I think you will have in mind the chief points that have established his reputation as a great Coleopterologist."

Mr. G. C. Champion writes from London, January 25th, 1898, "Dr. Horn had an excellent eye for picking out the important salient characters of genera and species, as well as for generalizing in matters of classification in which he showed exceptional powers. That his deductions were sound is proved by the fact that most of his work has been generally accepted. His long outstanding friendship

for LeConte perhaps hampered him at times, as he endeavored always to gloss over any lapsus LeConte may have made. I am not aware that he introduced any particular improvements in the study of Coleoptera, except, perhaps, that of constantly giving brief synoptic tables of genera and species based upon their more important characters, without introducing unnecessary details in which the main points were lost. This remark applies also to his descriptions. He must of course be regarded as a follower of LeConte, from whom his earliest ideas on the subject no doubt originated. Personally I had a great regard for him, as he was always ready to exchange ideas or communicate specimens whenever called upon, no matter how frequently, and during the preparation of my work on the Central American Heteromera and Elateridæ we were constantly corresponding. During his last visit to Europe I had the pleasure of making his personal acquaintance. I regard Dr. Horn as the best Coleopterist you have ever had, and he will be very much missed by all who take an interest in the very rich beetle fauna of America."

His sister writes: 'Dr. Horn's height was five feet, eight-and-a-half inches; he was slender and rather delicate in build, of fair, pale complexion, with dark brown hair. Of nervous temperament, his energy was boundless, enduring fatigue and loss of rest, which was apparently unnoticed by him and resulted as you know. He had a remarkably retentive memory, was always studious from childhood, quick to learn and ready to retain, and capable of imparting his knowledge to others. In all matters of judgment he was very independent, and adhered to his opinions. In regard to character he had marked originality. His fondness for children was so great that one might almost say a little child could lead him. His mechanical talents were quite marked. He had good practical business habits and was good at figures. He was fond of music without any particular talent' therefor.

Although a systematist in Entomology, he was not so in his "den," and Prof. Smith has given an amusing account of the disorder of his combined working- and bed-room. He possessed the salt of humor, and, whether originator of the expression or not, introduced among us the phrase, "mihi-itch" to designate the condition of those whose ambition is chiefly to describe new species. If not an artist

in the subjective sense, he was quite skillful with his pencil and illustrated most of his writings.

In politics, like his father, he was a Republican and held at least one elective office, that of a School Director in the Twelfth Ward of his native city, to which he was chosen February 17th, 1880.

In early years he attended the German Reformed church and Sunday-school, of which his parents were communicants. His sister adds: "His early religious training seemed to make no lasting impression on his maturer years. Mingling, as he did, with scientific friends, religion seemed to be lost in science and he never became a church member. While he had a great respect for the church and friends among the clergy, he held his own religious opinions."

He never married.

His collection of Coleoptera, whose present extent has not been estimated, his entomological library amounting to about 950 volumes, and the sum of five thousand dollars were bequeathed by him to this Society, one thousand dollars to the Academy of Natural Sciences, five hundred dollars to the American Philosophical Society.

Of his connection with our own body it remains but to add that he served as President from December 10th, 1866, to December 14th, 1868; as Vice-President from December 13th, 1869, to December 10th, 1883, and as President from this last date until his death. He was a member of the Standing Committee on Coleoptera from December 14th, 1868, until the discontinuance of the Committee in 1884, and frequently served on the Finance and Publication Committees.

Of the Entomological Section of the Academy of Natural Sciences he was Vice-Director from its foundation, May 12th, 1876, to December 12th, 1883, and Director from this latter date until his death.

Fitting it is to close with these words, adopted December 23rd, 1897,—"The American Entomological Society hereby records its deep sense of the great loss it has sustained in the death of Dr. George H. Horn, a member for thirty-seven years and its President for the last fourteen years. It gratefully acknowledges the lustre which his attainments and honors reflected upon this Society in his connection with it, and the benefits which his learning and liberality conferred. It rejoices in the successes he attained and cherishes the memory of his labors which form so large a part of the progress of Entomology in America."

List of Degrees and Memberships in Scientific Bodies held by Dr Horn:

1858. Feb. 11.—Bachelor of Arts, Central High School, Philadelphia.
1860. July 23.—Member, Entomological Society of Philadelphia (name changed to American Entomological Society 1867).
1861. Mar. 14.—Doctor of Medicine, University of Pennsylvania, Philadelphia.
1863. Feb. 12.—Master of Arts, Central High School, Philadelphia.
1866. July 31.—Member, Academy of Natural Sciences, Philadelphia.
1868. Oct. —Member, College of Physicians, Philadelphia.
1868. Nov. 10.—Honorary Member, Entomological Society of Ontario.
1869. Jan. 15.—Member, American Philosophical Society, Philadelphia.
1872. Dec. 4. —Member, Société Entomologique de Russie, St. Petersburg.
1877. May 3. —Member, Entomologisches Verein, Stettin.
1880. Dec. 22.—Member, Société Entomologique de France, Paris.
1884. Feb. 8. —Corresponding Member, Biological Society, Washington.
1884. Oct. 4. —Member, K. K. zoologisch-botanische Gesellschaft, Vienna.
1884. Dec. 13. —Honorary Member (ten in all), Entomologisches Verein, Stettin.
1884. —Member, Société Francaise d'Entomologie, Caen.
1885. Mar. 11.—Honorary Member (ten in all), Société Entomologique de France, Paris.
1889. Jan. 9. —Corresponding Member, Colorado Biological Association.
1893. April 19.—Corresponding Member, Boston Society of Natural History.
1893. Dec. 26. —Honorary Member (twelve in all), Société Entomologique de Belgique, Brussels.
1894. May 6. —Honorary Member, Feldman Collecting Social, Philadelphia.
1895. June 1. —Honorary Member, Kansas Academy of Science, Topeka.
1896. Oct. 7. —Honorary Member, Russian Entomological Society, St. Petersburg.
1897. Mar. 24.—Doctor of Science, Western University of Pennsylvania, Pittsburg.

NOTE.—The preceding biographical notice has been read by Messrs. Charles Liebeck, Henry Skinner, M.D., H. W. Wenzel, J. H. B. Bland, Wm. J. Fox and E. T. Cresson. The list of questions contained in the Appendix to Francis Galton's "English Men of Science" was taken as a basis, and the endeavor has been to answer as many of these as possible. The information above given is based on many notes kindly furnished by Mrs. Lewis Haehnlen, Dr. Horn's only surviving sister, on personal items contained in Dr. Horn's published papers, and those due to the kindness of Mr. Samuel Henshaw, of Cambridge, Mass. In many cases where Dr. Horn himself is the authority for a statement, this has been indicated by placing a small figure corresponding to the number of the paper quoted in Mr. Henshaw's Bibliography (*post.*). Reference has also been made to the following articles—'Biographical notices of Harrison Allen and George Henry Horn' by Edward J. Nolan, and 'Dr. Horn's contributions to Coleopterology' by John B. Smith, both addresses at a Memorial Meeting, and published in the Proceedings of the Academy of Natural Sciences, Philadelphia, Dec., 1897; Dr. Nolan's paper is of importance for its picture of the Academy as it was when Horn's work began; 'George Henry Horn' unsigned, but by Samuel

Henshaw, *Psyche*, Cambridge, Mass., for January, 1898; 'George Henry Horn' by John B. Smith, *Science*, New York, for Jan. 21 1898. The statements concerning the High School of Horn's time are drawn from the pamphlet, "The Semi-Centennial of the Central High School of Philadelphia" by various authors, published in 1888.

P. S.—After the greater part of the preceding biography had passed through the press, the following letter was received in reply to one of February 17th:

SAN FRANCISCO, CAL., April 15, 1898.

Mr. PHILIP P. CALVERT, Phila., Pa.

DEAR SIR:—I send you the military history of Dr. George H. Horn while on the Pacific coast during the war of the Rebellion. [Then follows a statement of the services and commissions held, already given.]

I first became acquainted with Dr. Horn at Fort Tejon, Cal., in October, 1863. Companies "B" and "G" of the 2nd Cal. Infantry relieved a Company of the 2nd Cal. Cavalry that had been stationed there. Dr. Horn was Surgeon, and the Doctor continued with us until I was promoted to Captain and ordered with the Company to Fort Yuma. Company B was commanded by Capt. Schmidt, a pompous German, and he being senior officer commanded the Post and his own company, of course. I, besides commanding my own Company G, was A. A. Q. M. and A. C. S., Post Adjutant and Post Treasurer. Dr. Horn used to laugh at my various duties. Besides, Capt. Schmidt or myself had to be officer of the day every other day. Capt. Schmidt suggested that the doctor be asked to act as officer of the day every third day. I told the Captain that it was not in the line of the doctor's duties, and the doctor was never asked, but I do not think he would have objected.

The doctor and myself had our Mess together. We enjoyed each other's company as much as any two men can. We were both fond of playing cribbage and often played till past midnight. In a match of a 1000 game up, there was only six difference, and that in the doctor's favor.

I accompanied the doctor many times hunting insects. We turned over large stones, striped dead bark from trees, turned over all the rotten logs we could find for miles around, and I got to be as great an enthusiast as himself. In this way we passed about eight months, the most pleasant of my life, and when we said our final good-bye, the doctor said "I don't know where I will get a partner that I will like as well." We corresponded, but I saw no more of him until he was finally mustered out in 1866.

I imagined the doctor was very lovable in his family relation from the tone and length of his letters to his sister and hers to him, and the "dear chum" letters between him and his little brother.

Dr. Horn stood very high at Head Quarters here as a Surgeon and Physician, as shown by his promotions and constant service.

He was strict in his duties and allowed no interference when he thought he was right, as the following incident will show. When the Regiment was on the march from Arizona to San Francisco to be mustered out, the Colonel, Thomas F. Wright, selected a place to camp. Dr. Horn went to the Colonel and told him

it was not a fit place to camp, being low and damp. After a great deal of talk and some hard words, the Colonel allowed the doctor to have his way and select a suitable place, and received the thanks of the officers and men. The Colonel never spoke to the doctor after that.

Excuse delay. Your letter found me in bed sick—have been in that condition for a month, then I had a relapse that laid me up a couple of weeks longer.

Yours truly,

JOHN E. HILL,

Late Captain 2nd Cal. Vol.

922 Van Ness Ave.

The Entomological Writings of George Henry Horn.

(1860–1896.)

WITH AN INDEX TO THE GENERA AND SPECIES OF COLEOPTERA DESCRIBED AND NAMED.

BY SAMUEL HENSHAW.

While care has been taken to make this record complete and accurate mention of any omissions and errors that may be noticed will be welcomed.

In the list of published writings the chronologic order has been followed.

The systematic index to the genera and species of Coleoptera is arranged according to the plan followed when dealing with the Coleoptera of John L. and J. E. LeConte (Trans. Amer. Ent. Soc., 1881–82, vol. ix, p. 197–272). The first number following the name refers to the accompanying list of published writings, and the second to the page of the publication cited. Original generic names when different from those used here follow in brackets.

The types are, for the most part, in the Horn collection, now one of the valued possessions of the American Entomological Society.

Species marked with an * are fossil.

The alphabetical index refers to the list of published writings and used in combination with the systematic index affords ready access to the subjects discussed in Dr. Horn's entomological writings.

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1. CHRONOLOGICAL LIST OF PUBLISHED WRITINGS.

1. Descriptions of new North American Coleoptera, in the cabinet of the Entomological Society of Philadelphia.
   Proc. Acad. Nat. Sci. Phila., December, 1860, p. 569-571, pl. 8.
2. Notes on the habits of some coleopterous larvæ and pupæ.
   Proc. Ent. Soc. Phila., July, 1861, vol. i, p. 28-30.
3. Observations on the habits of some coleopterous larvæ and pupæ.
   Proc. Ent. Soc. Phila., September, 1861, vol. i, p. 43-44.
4. Monograph of the species of *Trogosita* inhabiting the United States.
   Proc. Acad. Nat. Sci. Phila., February, 1862, p. 82-88.

5. Description of some new North American Coleoptera.
   Proc. Ent. Soc. Phila., April, 1862, vol. i, p. 187-188.
6. Description of some new Cicindelidæ from the Pacific coast of the United States.
   Proc. Acad. Nat. Sci. Phila., December, 1866, p. 394-397.
7. Descriptions of some new genera and species of Central American Coleoptera.
   Proc. Acad. Nat. Sci. Phila., December, 1866, p. 397-401.
8. Notes on the habits of a few California Coleoptera.
   Proc. Ent. Soc. Phila., January, 1867, vol. vi, p. 289-293.
9. On *Usechus lacerta* Motsch.
   Proc. Ent. Soc. Phila., January, 1867, vol. vi, p. 293-294.
10. On *Rhagodera tuberculata*, Mann.
    Proc. Ent. Soc. Phila., January, 1867, vol. vi, p. 294-296.
11. Some observations on *Phodaga alticeps*, Lec.
    Proc. Ent. Soc. Phila., January, 1867, vol. vi, p. 296.
12. Description of a new *Pseudomorpha* from California, with notes on the Pseudomorphidæ.
    Trans. Amer. Ent. Soc., June-July, 1867, vol. i, p. 151-154, pl. 3 in part.
13. On *Amphizoa insolens*, Lec.
    Trans. Amer. Ent. Soc., July, 1867, vol. i, p. 154-158.
14. Notes on the *Zopheri* of the United States.
    Trans. Amer. Ent. Soc., July, 1867, vol. i, p. 159-162.
15. Descriptions of new genera and species of western Scarabæidæ, with notes on others already known.
    Trans. Amer. Ent. Soc., July, 1867, vol. i, p. 163-170, pl. 3 in part.
16. *Geotrupes* of Boreal America.
    Trans. Amer. Ent. Soc., January, 1868, vol. i, p. 313-322.
    (Cf., op. cit., p. 18, Proc.)
17. [The United States species of *Cicindela*.]
    Trans. Amer. Ent. Soc., February, 1868, vol. i, p. 2-3, Proc.
18. [Note concerning *Dysmathes sahlbergi* Mannh.]
    Trans. Amer. Ent. Soc., February, 1868, vol. i, p. 18, Proc.
19. Catalogue of Coleoptera from south-western Virginia.
    Trans. Amer. Ent. Soc., August, 1868, vol. ii, p. 123-128.
20. New species of Coleoptera from the Pacific district of the United States.
    Trans. Amer. Ent. Soc., August, 1868, vol. ii, p. 129-140.
21. [Characters of *Cossyphus*.]
    Trans. Amer. Ent. Soc., December, 1869, vol. ii, p. 10, Proc.

21a. [*Cantharis*, *Acanthia* and other Hemiptera.]
    Outlines of comparative anatomy and medical zoology. By Harrison Allen. Philadelphia, 1869, p. 147-153; 156-157.

22. Synopsis of the Parnidæ of the United States.
    Trans. Amer. Ent. Soc., January-February, 1870, vol. iii, p. 29-42.
23. Notes on some genera of coprophagous Scarabæidæ of the United States.
    Trans. Amer. Ent. Soc., February-March, 1870, vol. iii, p. 42-51.
24. Contributions to the coleopterology of the United States.
    Trans. Amer. Ent. Soc., June, 1870, vol. iii, p. 69-97.
25. Descriptive catalogue of the species of *Nebria* and *Pelophila* of the United States.
    Trans. Amer. Ent. Soc., June-September, 1870, vol. iii, p. 97-105.

26. On the species of *Oodes* and allied genera of the United States.
Trans. Amer. Ent. Soc., September, 1870, vol. iii, p. 105–109.
27. Description of the species of *Aphodius* and *Dialytes* of the United States.
Trans. Amer. Ent. Soc., September, 1870, vol. iii, p. 110–134, pl. 3 in part.
28. Descriptions of new species of Histeridæ of the United States.
Trans. Amer. Ent. Soc., September, 1870, vol. iii, p. 134–142, pl. 1.
29. Coleoptera.
Rec. Amer. Ent. for 1869, 1870, p. 38–46.
30. Revision of the Tenebrionidæ of America, north of Mexico.
Trans. Amer. Philos. Soc., 1870, vol. xiv, p. 253–404, pls. 14–15.
31. Synopsis of the species of *Corphyra*, Say, of the United States.
Trans. Amer. Ent. Soc., April, 1871, vol. iii, p. 278–283.
32. Synopsis of Aphodiini of the United States.
Trans. Amer. Ent. Soc., April–June, 1871, vol. iii, p. 284–297, pl. 3, in part.
33. Remarks on the species of the genus *Isomalus* Er. of the United States.
Trans. Amer. Ent. Soc., June, 1871, vol. iii, p. 297–299.
34. Descriptions of new species of Elateridæ, of the United States.
Trans. Amer. Ent. Soc., June–October, 1871, vol. iii, p. 299–324, pl. 4.
35. Descriptions of new Coleoptera of the United States, with notes on known species.
Trans. Amer. Ent. Soc., November–December, 1871, vol. iii, p. 325–344, pl. 3 in part.
36. Coleoptera.
Rec. Amer. Ent. for 1870, 1871, p. 13–19.
37. [Descriptions and figures of the early stages of *Agriotes mancus*.]
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213. [Insects passed from the human body.]
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214. [Stridulating Coleoptera.]
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214*a*. [Remarks on effects of habitual use in the modification of an animal organization.]
Proc. Amer. Philos. Soc., December, 1889, vol. xxvi, p. 529.
215. The species of *Heterocerus* of Boreal America.
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(Cf. op. cit. vol. xvi, p. 9. 10, Proc.)
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218. A reply to Dr. C. V. Riley.
No imprint, [February, 1890.]
219. The "ultimate larva" of *Platypsyllus*.
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220. [New species of *Cychrus*.]
Ent. Amer., April, 1890, vol. vi, p. 71–72.
221. Notes on Elateridæ.
Ent. News, April, 1890, vol. i, p. 53–55.
222. [Synoptic table of *Anthophilax*.]
Ent. Amer., May, 1890, vol. vi, p. 98.

223. [Breeding habit of *Cœnopœus palmeri*.]
Proc. Ent. Soc., Washington, May, 1890, vol. i, p. 252.
224. Notes on some Hydrobiini of Boreal America.
Trans. Amer. Ent. Soc., July-August, 1890, vol. xvii, p. 237-278, pl. 3-4, pl. 9 in part.
225. A revision of the Sphæridiini inhabiting Boreal America.
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226. Some notes on *Arœoschizus*.
Trans. Amer. Ent. Soc., November, 1890, vol. xvii, p. 339-343.
227. [Central American] Throscidæ [and] Eucnemidæ.
Biol. Centrali-Americana, Insecta, Coleoptera, vol. iii, pt. 1, November, 1890, p. 193-257, pl. 10.
228. The antennæ of Coleoptera.
Proc. Acad. Nat. Sci., Phila., November, 1889, p. 311.
229. [Form of *Ergates spiculatus* Lec.]
Ent. News, December, 1890, vol. i, p. 161.
230. *Trichodes ornatus* Say.
Ent. News, January, 1891, vol. ii, p. 6-8.
231. A monograph of the species of *Cryptohypnus* of Boreal America.
Trans. Amer. Ent. Soc., January-February, 1891, vol. xviii, p. 1-31, pl. 1 in part.
232. New species and miscellaneous notes.
Trans. Amer. Ent. Soc., February, 1891, vol. xviii, p. 32-48, pl. 1 in part.
233. The species of *Agrilus* of Boreal America.
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234. Notes on *Calospasta* Lec.
Proc. Amer. Philos. Soc., October, 1891, vol. xxix, p. 99-102.
235. A good collection of *Agrilus* at the National Museum.
Insect Life, November, 1891, vol. iv, p. 137.
236. Studies in Chrysomelidæ.
Trans. Amer. Ent. Soc., January-February, 1892, vol. xix, p. 1-18.
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Ent. News, February, 1892, vol. iii, p. 25-28, pl. 1.
238. Notes on *Amara* s. g. *Trixna*.
Trans. Amer. Ent. Soc., February, 1892, vol. xix, p. 18-19.
239. A study of *Amara* s. g. *Celia*.
Trans. Amer. Ent. Soc., February-March, 1892, vol. xix, p. 19-40.
240. *Carabus nemoralis* Müll.
Ent. News, March, 1892, vol. iii, p. 60-61.
241. Random studies in North American Coleoptera.
Trans. Amer. Ent. Soc., March, 1892, vol. xix, p. 40-48.
242. *Dorcus parallelus* Say.
Ent. News, April, 1892, vol. iii, p. 73-74, pl. 3.
243. The Eumolpini of Boreal America.
Trans. Amer. Ent. Soc., July-August, 1892, vol. xix, p. 195-234.
244. The Galerucini of Boreal America.
Trans. Amer. Ent. Soc., April-June, 1893, vol. xx, p. 57-136, pl. 1 in part.
245. Miscellaneous coleopterous studies.
Trans. Amer. Ent. Soc., June, 1893, vol. xx, p. 136-144, pl. 1 in part.

246. *Amblychila cylindriformis* Say.
Ent. News, November, 1893, vol. iv, p. 281–283.
247. A note on *Cryptohypnus*.
Ent. News, January, 1894, vol. v, p. 6–7.
248. [*Saprinus sulcatus*.]
Ent. News, January, 1894, vol. v, p. 14.
249. Synonymical notes.
Ent. News, February, 1894, vol. v, p. 41.
250. Note on *Platypsyllus*.
Ent. News, May, 1894, vol. v, p. 141.
251. *Cassida nebulosa* Linn.
Ent. News, May, 1894, vol. v, p. 146.
252. The Coleoptera of Baja California.
Proc. Cal. Acad. Sci., August, 1894, ser. 2, vol. iv, p. 302–449, pl. 7–8.
253. Notes on our Cassididæ.
Ent. News, September, 1894, vol. v, p. 224.
254. *Vesperoctenus flohri* Bates.
Ent. News, April, 1895, vol. vi, p. 114–115.
255. Studies in Coccinellidæ.
Trans. Amer. Ent. Soc., April–May, 1895, vol. xxii, p. 81–114, pl. 1–2.
256. [Synonymical notes.]
Ent. News, June, 1895, vol. vi, p. 179.
257. Coleoptera of Baja California. (Supplement I.)
Proc. Cal. Acad. Sci., July, 1895, ser. 2, vol. v, p. 225–259, pl. 20.
258. [Synonymical notes.]
Ent. News, December, 1895, vol. vi, p. 326.
259. A visit to Cambridge.
Ent. News, February, 1896, vol. vii, p. 49–50.
260. Review [Cambridge natural history, vol. v.]
Ent. News, February, 1896, vol. vii, p. 53–54.
261. Auguste Sallé.
Ent. News, June, 1896, vol. vii, p. 192.
262. [Julius Flohr.]
Ent. News, September, 1896, vol. vii, p. 203.
263. Coleoptera of Baja California. (Supplement II.)
Proc. Cal. Acad. Sci., September, 1896, ser. 2, vol. vi, p. 367–381.
264. The Œdemeridæ of Boreal America.
Proc. Cal. Acad. Sci., September, 1896, ser. 2, vol. vi, p. 382–421.
265. [Note on Buprestidæ.]
Ent. News, October, 1896, vol. vii, p. 247.

2. INDEX TO THE GENERA AND SPECIES OF COLEOPTERA.

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= conjuncta *Lec.**

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* I am indebted to Mr. E. A. Schwarz for the following "SYNONYMICAL NOTE. From Dr. LeConte's very lucid original description of *Bryaxis conjuncta* it is evident that this name should be retained for the species which in the ♂ has strongly clavate antennæ, spinous anterior trochanters, etc. In his earlier studies on Pselaphids, Dr. Brendel became aware that there were two species confounded under *B. conjuncta*, but the new species characterized by him as *B. clavata* is precisely identical with *B. conjuncta* Lec., whereas what he supposed to be the true *B. conjuncta* is characterized by him as having, in the ♂, less clavate antennæ and unarmed trochanters. For reasons unknown to me all subsequent writers on Pselaphids, including Dr. LeConte himself, have adopted Brendel's nomenclature.

The synonymy of the two species stands as follows:

1. *Bryaxis conjuncta* LeConte, Bost. Journ. Nat. Hist., vol. vi, 85. 1850.
conjuncta var. *clarata* Brendel, Proc. Ent. Soc. Phila., vol. v, 256. 1865.
clavata Brendel, Proc. Ent. Soc. Phila., vol. vi, 193. 1866.
brendelii Horn, Crotch's Check List, 36. 1874.
brendelii LeConte, Trans. Amer. Ent. Soc., vol. viii, 181, 1880.
brendelii Brendel, Bull. Lab. Nat. Hist. Iowa, vol. i, 274, t. 8, f. 47, 1890.

2. *Bryaxis conjuncta* Brendel, Proc. Ent. Soc. Phila., vol. vi, 193, 1866.
conjuncta LeConte, Trans. Amer. Ent. Soc., vol. viii, 181, 1880.
conjuncta Brendel, Bull. Lab. Nat. Hist. Iowa, vol. i, 273, t. 8, f. 46, 1890.

A new name has to be coined for the second species."—E. A. SCHWARZ.

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* A new name proposed for the apterous species from Margarita Island named *L. bicolor* (1894), unmindful of the winged species from New Mexico previously (1889) given the same name.

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* See Proc. Ent. Soc. Phila., vol. vi, p. xii, Proc.

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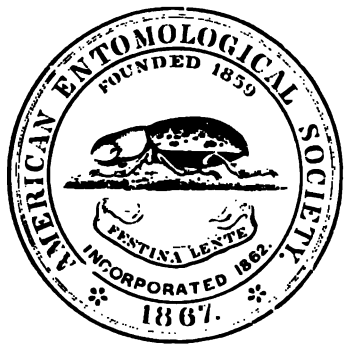

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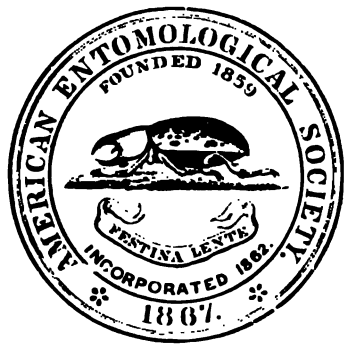

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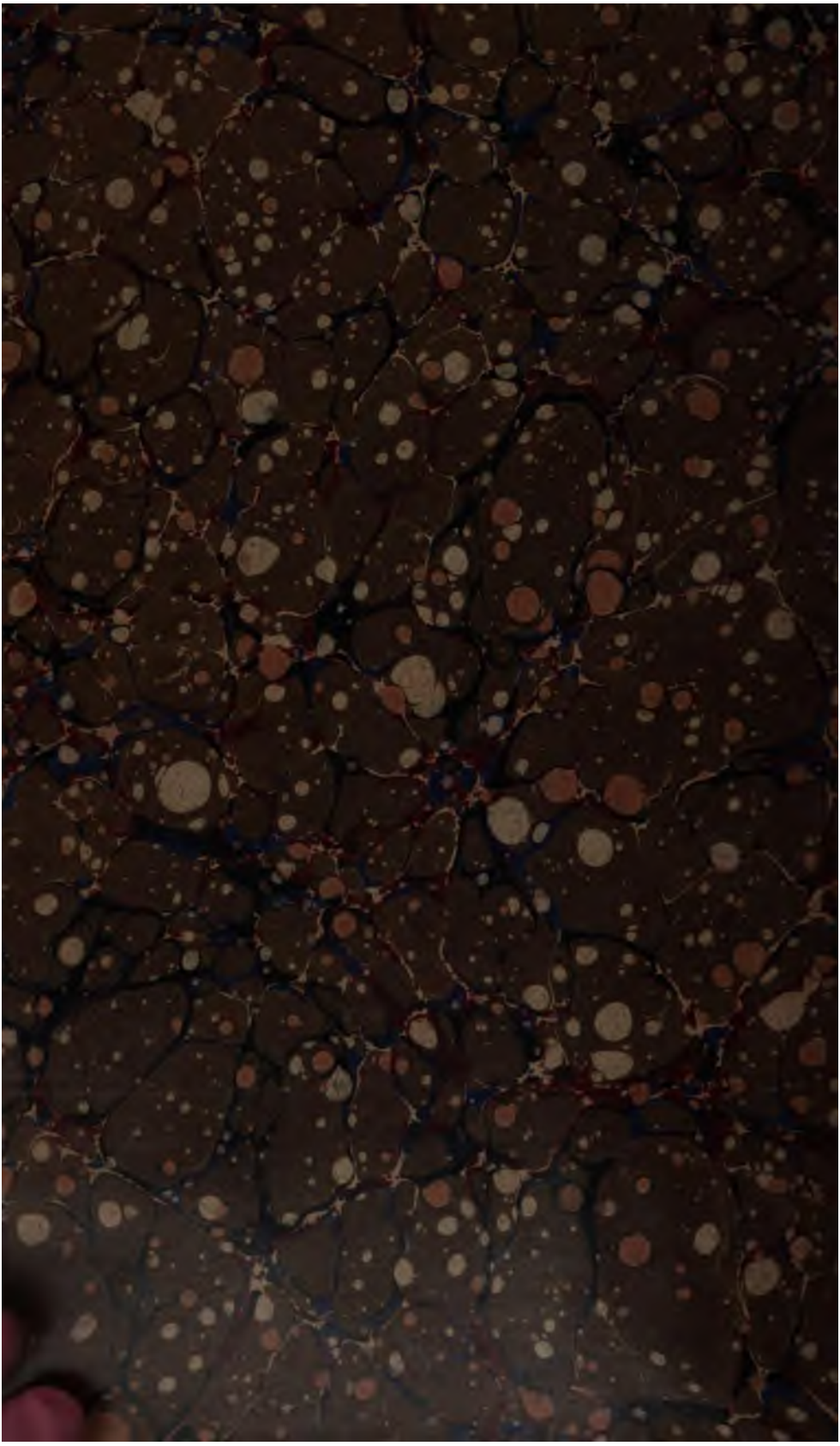

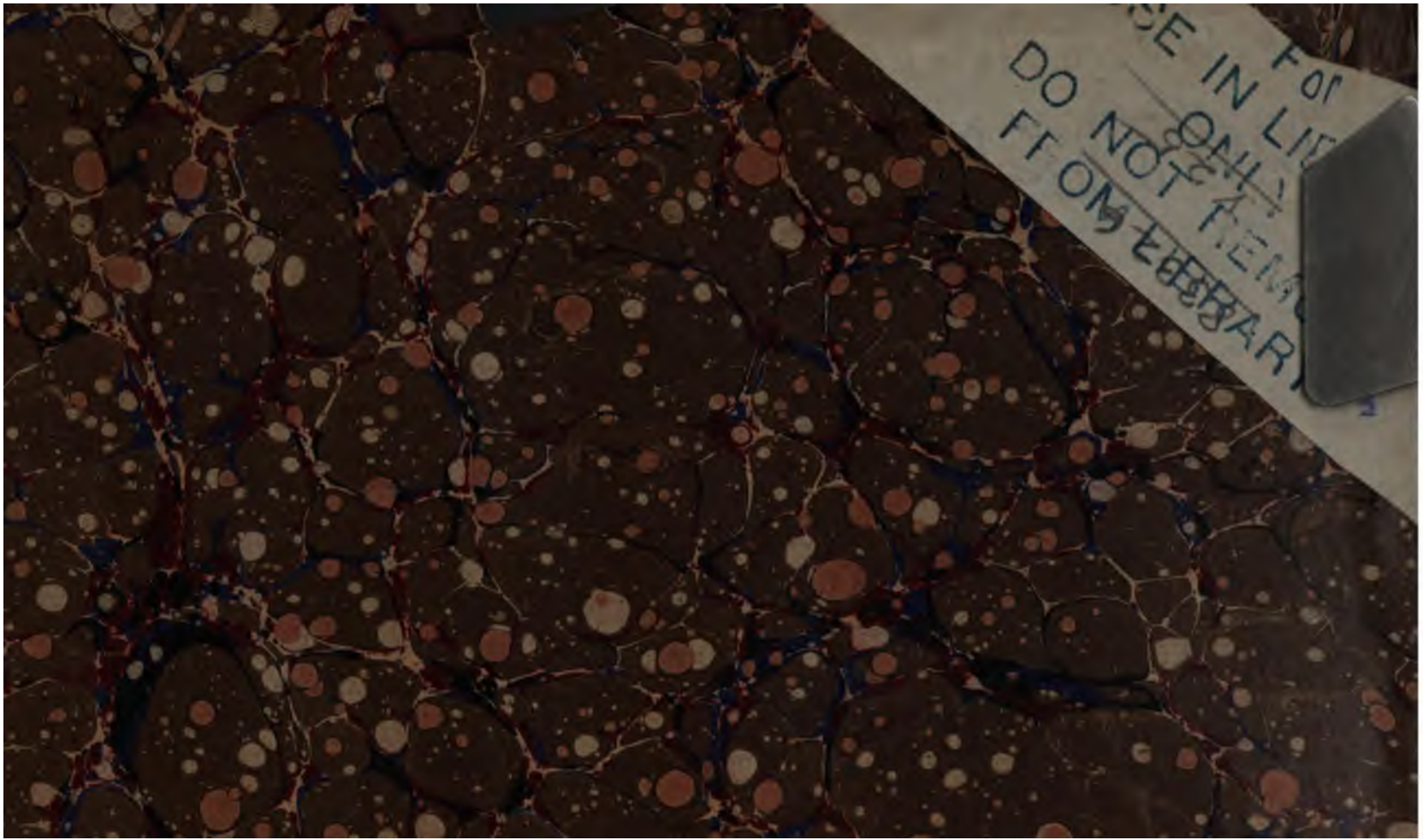
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